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NATIONAL GEOGRAPHIC

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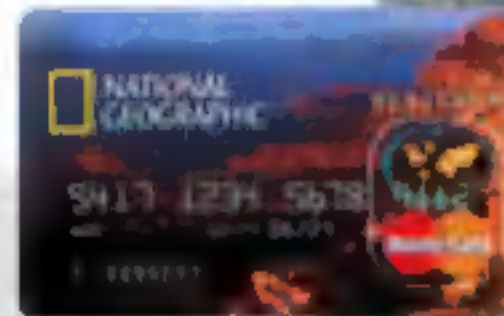
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TEXT AND PHOTOGRAPHS BY STEVE WINTER

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BY DONOVAN WEBSTER PHOTOGRAPHS BY MARIA STENZEL

- 104** **Yellowstone and the Tetons** Crowning the National Parks system, this grand expanse of jutting mountains, steaming geysers, and manifold animals stirs the soul.

BY ALEXANDRA FULLER

- 124** **ZipUSA: 58102** *Fargo*, the 1996 movie, was filled with quirky characters and lots of snow. The film got the snow right, but North Dakota's largest city has a personality all its own.

BY DAVID BEERS PHOTOGRAPHS BY NINA BERMAN

DEPARTMENTS

OnScreen & Online
From the Editor

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Geographica

Behind the Scenes

Who Knew?

Final Edit

On Assignment

Flashback

THE COVER

Outlasting the intrigues of his own day, an Egyptian official stares from his tomb wall.

BY KENNETH GARRETT

♻️ Cover printed on recycled-content paper

ON THE NGM WEBSITE

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Earth Day, every day. From the cleanest car company on the planet.

We love clean air. Coming from a car company, that's not an easy claim to prove. Unless, of course, you're Honda.

We've had a long history of environmental leadership, featuring a line of automobiles that have repeatedly set industry standards for cleaner engine technology. And, recently, the Union of Concerned Scientists named Honda the cleanest car company in the world.*

Consider the Civic, the first mass-market vehicle to provide a hybrid powertrain option in America. With up to 650 miles to every tank of gas, it's America's fuel-economy marvel.† There's also the zero-emission, hydrogen-powered Honda FCX, the first fuel-cell car to be government certified for use on public roads. All the way down the line, every Honda car is a Low-Emission Vehicle or cleaner.

In many respects, it's always been this way. Honda was the first automaker to meet the emission standards of the 1970 Clean Air Act, without a catalytic converter. We were the first to meet the cleanest engine standard (SULEV), and the very first to introduce hybrid technology to America.

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SUNDAYS, 8 P.M. ET/PT

Kratt Brothers: Be the Creature

Come close—as in a few feet—to a grizzly bear, an African wild dog, and a great white shark as naturalists Chris and Martin Kratt try to live with animals on their turf and experience the world the way their wild subjects do. For their new 13-part series, *Be the Creature*, the brothers also prowl African water holes with a pride of lions, get to know how a killer whale hunts off the coast of Patagonia, and bathe with macaques in the hot springs of Japan. In Madagascar the Kratts climb trees with lemurs (left), and in Texas they hang out in a cave with 20 million Mexican free-tailed bats. Anything, anywhere, to be the creature.



VISIT NATIONALGEOGRAPHIC.COM/CHANNEL TO FIND OUT WHAT'S ON—AND HOW TO GET THE CHANNEL IN YOUR AREA

MONDAYS, 8 P.M. ET/
9 P.M. PT

Worlds Apart

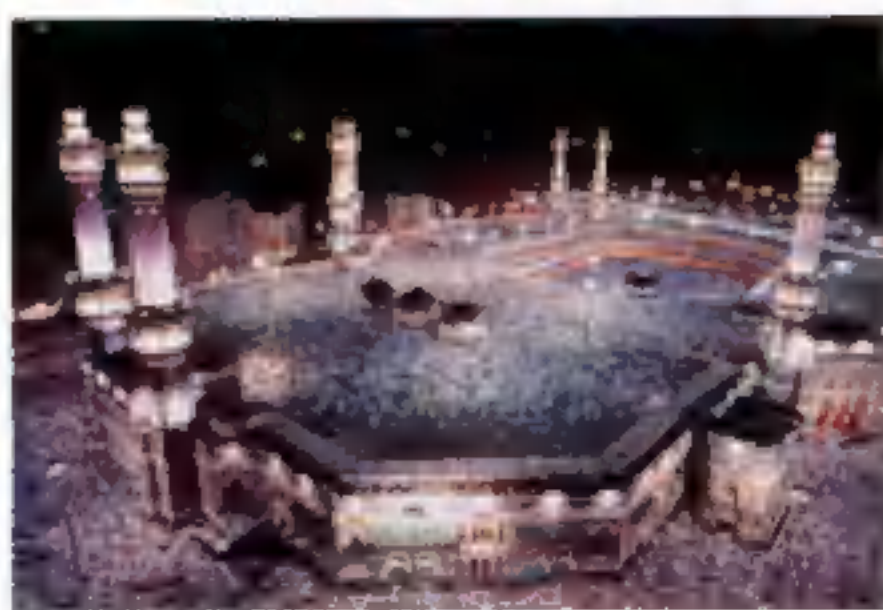
Wanted: Curious, adventure-seeking families willing to live without TV or takeout. *Worlds Apart*, the exciting series that sends families to live in remote parts of the world, is taking applications at nationalgeographic.com/channel.

Channel and NGT&F programming information accurate at press time; consult local listings or the Society's website at nationalgeographic.com

NG Television & Film

NATIONAL GEOGRAPHIC SPECIAL, PBS, WEDNESDAY, OCTOBER 22
8 P.M. ET/PT

Inside Mecca Join the annual pilgrimage known as the hajj as National Geographic follows three Muslims from different parts of the globe to Saudi Arabia. The one-hour special features rare footage inside the Grand Mosque (right) and details the way Mecca, Islam's most sacred city, changes the lives of those who visit it.



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NOVEMBER 26, 8 P.M. ET
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PHOTOGRAPHY HOME PAGE

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SIGHTS & SOUNDS OF CUBA'S WILDLIFE

FANTASY ISLAND For five months Steve Winter photographed endemic animals—from tiny frogs to bat-eating boas—in habitats found nowhere else in the world. Now see his original video.

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AOL Keyword NatGeo

EMERGING EXPLORER Tierney Thys When you explore the world's oceans, a 5,000-pound fish would seem hard to miss. Yet until marine biologist Tierney Thys and her team began researching the giant sunfish (mola), it had been virtually unstudied. Now, by attaching satellite tags, Tierney and her team are tracking molas throughout the world's oceans, using this pioneering data to shed new light on the larger, mysterious web of ocean life.



PHOTOS: MIKE JOHNSON

WHEN I FIRST SAW THE MOLA

I was immediately drawn to it—

it is one of the

strangest looking fish

in the sea and yet so

amazingly graceful.

Each animal has a story

to tell and every mola

we tag is a window into

how the vast ocean works—

part of a much bigger picture.

I hope our work adds one more

piece to that growing picture,

helping us more conscientiously

explore the oceans while safe-

guarding the life within."

—Tierney Thys, Marine Biologist

Around the world, National

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boundaries of discovery.



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NGS PHOTOGRAPHER MARK THIESSEN

Like a lot of Americans, I get up weekday mornings and drive to work. My commute takes me past the Pentagon and within a block or two of the Treasury Department and the White House. Though I've never actually seen surveillance cameras on or near any of those buildings, it's a safe bet they're there, monitoring me as I pass by. And I know for certain that once I get to National Geographic headquarters, internal cameras are recording me (left) as I make my way to my office.

It's not that I'm a particularly shady character. Or that I happen to work in Washington, D.C. It's that we now live in a world of electronic surveillance.

As writer David Shenk discovered (page 2), the average visitor to central London is filmed 300 times in a single day. In developed countries everything from red-light runners to potential terrorists, from online conversations to bank records can be tracked electronically. Each of us can be profiled—by medical history, by consumer tastes, by travel habits.

If you're a privacy advocate, you may worry that the age of Big Brother is upon us. Others of you may believe the new electronic vigilance ensures a safer world. Think you know which side you're on? Read the article; you may be surprised.

Bill Allen

I'VE NEVER SEEN ANYTHING LIKE IT!

- GUY WHO'S BEEN EVERYTHING

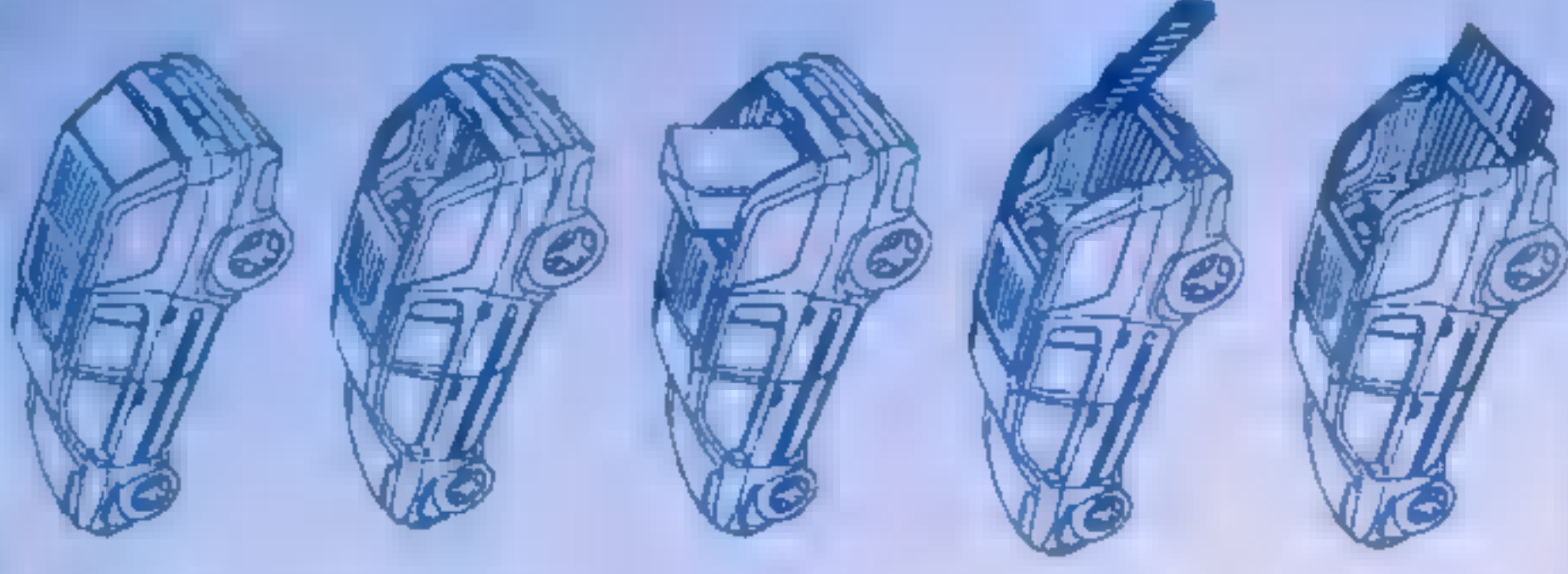


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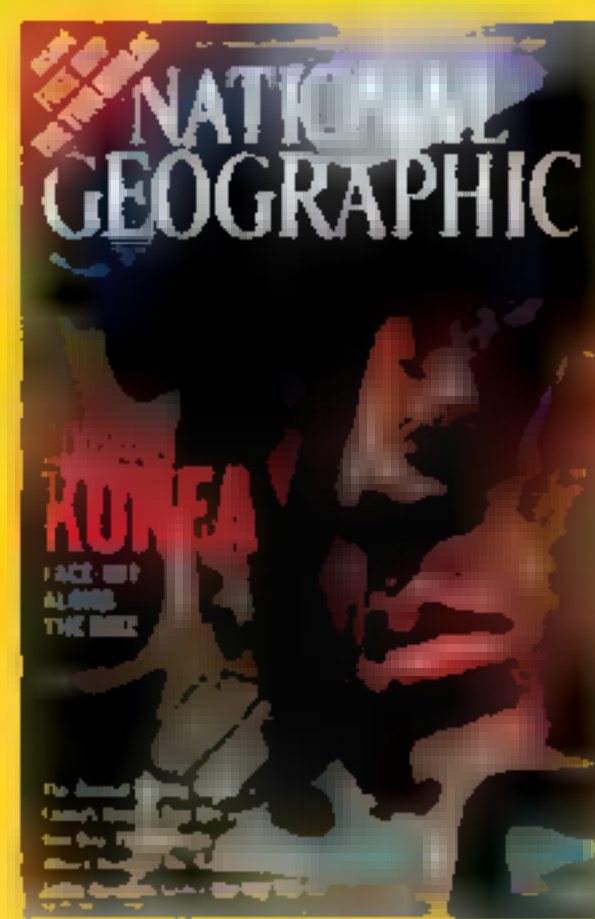


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Forum

July 2003

Henry Wright's three-page essay on the looting of the Iraq Museum in Baghdad, "An Archaeologist's Lament," generated more mail than any other *Geographica* piece in the magazine's history (in this issue, only the feature story "Animal Attraction" provoked a bigger response). More than a third of these letters questioned Wright's estimates of the number of artifacts lost. Read on for an update.



Geographica: Iraq's Lost Antiquities

While the looting of the Iraq Museum in Baghdad is unfortunate, I dislike people like Henry Wright, who place most of the blame on the coalition forces rather than on the Iraqi people themselves. While Wright acknowledges that there were "frenzied mobs of looters" and a possible "plot by art thieves," he and others never seem to condemn the Iraqis who totally disregarded the significance of their national museum and stole from the building for profit.

CLARKE M. BRANDT
Aurora, Colorado

You report that tens of thousands of artifacts disappeared from the museum. One newspaper says a few dozen are missing. Whom should we believe?

LEROY McCAMPBELL
Palmyra, Virginia

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The total number of items taken from the Iraq Museum during the looting remains uncertain. Of the 14 objects we highlighted, eight are still unaccounted for. Several dozen high-profile sculptures and heads of statues that were removed from the museum's galleries are gone forever, Wright and other experts believe. A notable exception: The famous Warka vase was returned, albeit in pieces. Thousands of less well-known objects have also been returned or seized on their way out of the country, but that leaves thousands of other artifacts still missing, including as of this writing the museum's collection of close to 5,000 cylinder seals, small masterpieces that reveal much about religion and life in ancient Mesopotamia.

Three Peaks Challenge

I can't remember when I laughed so much reading a NATIONAL GEOGRAPHIC article. It was so refreshing. The magazine needs more T. R. Reids and Joel Sartores! I'd do a round of miniature golf with these guys any day.

MARIE COLBY
Eugene, Oregon

Thanks for the entertaining article. It made my day. My leg muscles ached just reading about



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White Rhinoceros (*Ceratotherium simum*)

Size: Head and body length, 3.6-4 m; shoulder height, up to 2 m **Weight:** Up to 2,300 kg

Habitat: Grasslands, savannas and desert-like areas of southern and central Africa

Surviving number: Estimated at 11,670 in the wild



Photographed by Gerry Ellis

WILDLIFE AS CANON SEES IT

The nose knows. Africa's white rhinoceros counts on its keen sense of smell to compensate for extremely poor eyesight. Yet this highly developed honker is a curse as well as a blessing; its two prominent horns command a high price for use in traditional medicines and ornamental daggers. The mild-mannered herbivore is an easy target for humans seeking to deprive it of its horns or its habitat. It spends much of its time peacefully grazing,

taking advantage of powerful lips perfectly adapted to feeding on both long and short grasses. Once a common and quintessential sight on the savanna, the white rhinoceros is seen less and less these days.

As an active, committed global corporation, we join worldwide efforts to promote awareness of endangered species. Just one way we are working to make the world a better place—today and tomorrow.

Animal Attraction

Phew! Pass the saltpeter and turn on the cold shower: "Animal Attraction" packed more ooh-la-la than any "true stories" section in a men's magazine.

PATTI HIEMSTRA
Dyer, Indiana

I am disappointed that the editors would allow the article to state that anacondas "prefer orgies" and that garden snails will "line up for a threesome." How utterly tasteless and insensitive to the fact that parents share NATIONAL GEOGRAPHIC with their children.

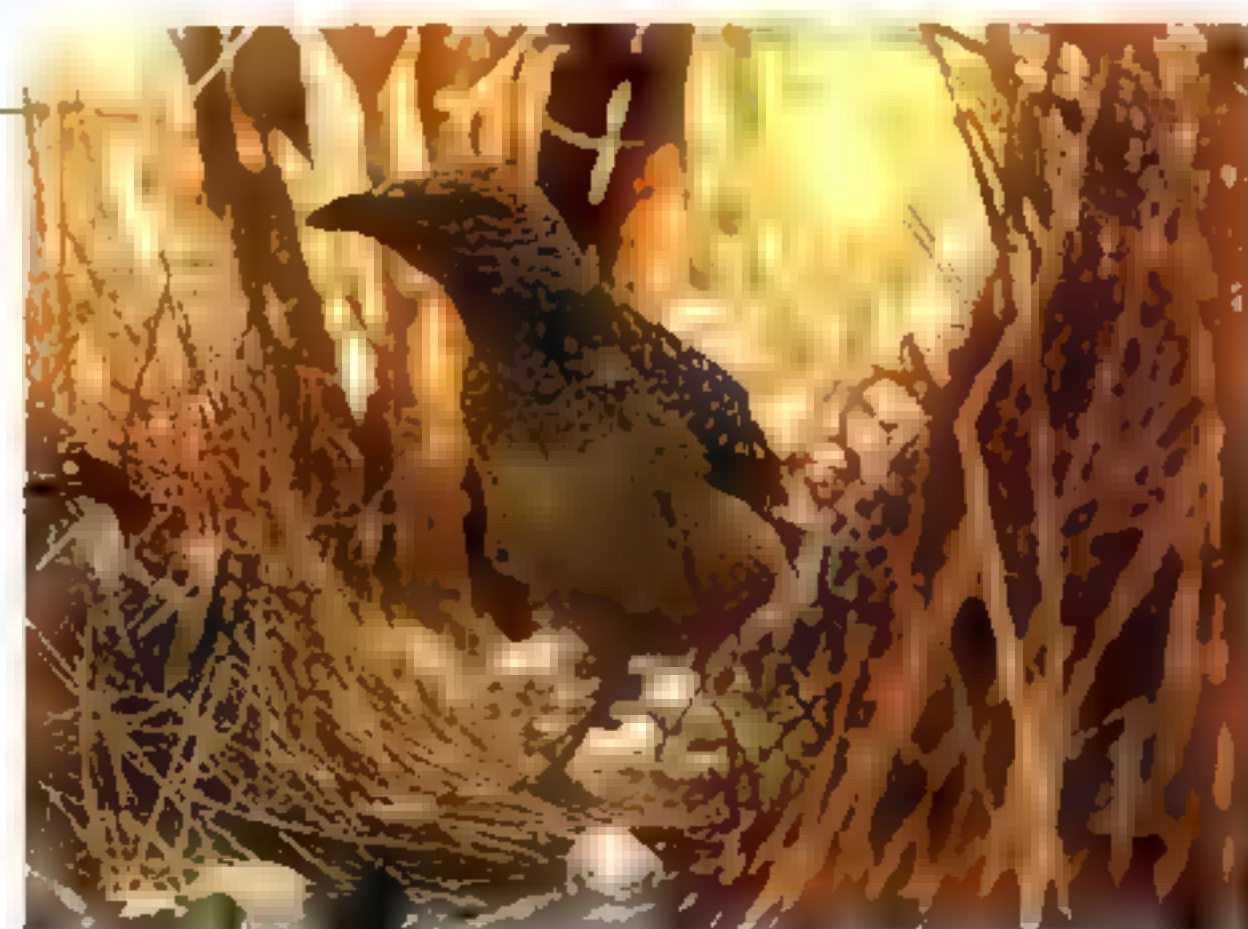
TONY CONDIA
Cincinnati, Ohio

The author spent so much time discussing bowerbirds, I was eagerly awaiting a photo of one. I still cannot believe

you did not include a picture.

CAROLYN GRAGG
San Diego, California

You're not alone. Here's a male bowerbird tending his tastefully decorated bower (right).



GERALD BORGIA

It appears to me that the male elk on the right of the photo on pages 28-9 isn't pursuing a female—he's chasing a young male (or what's called here in Montana a spike) away from his harem.

KEN MARTIN
Florence, Montana

The scientists we consulted before publishing the article identified the smaller elk as a female, but it's probably a male. While females do sometimes have small antlers, the elk being

chased by the big male appears to have a spike—an unbranched antler characteristic of young males.

The courting albatrosses on pages 52-3 are wandering albatrosses, a species that does indeed wander for courting and nesting, but not to the Galápagos. They breed on subantarctic islands. The Galápagos have their very own species of albatross, the waved albatross.

RETO ZACH
Pinawa, Manitoba

the challenge. I howled with laughter reading Sartore's notes.

WENDY CHOPP
Vancouver, Washington

Now I'm no prude. I admit to sneaking peeks at bare-breasted women from faraway places for which NATIONAL GEOGRAPHIC was so storied among my pre-adolescent peers. But "Three Peaks Challenge," which featured the tandem grossness of men vomiting and urinating, is glaringly inconsistent with a world-class publication. The gutter

is getting very crowded indeed.

STEPHEN L. DOLL
Ormond Beach, Florida

I thank my lucky stars that no diarrhea was contracted and duly captured on film for posterity—it probably would have made the cover.

MARK BRINCKERHOFF
Charlottesville, Virginia

It is always good to see my home country appear in your pages, but the article disappointed me. It did not address the impact of the challenge on some very fragile mountain environments, the almost complete lack of economic benefit generated for local communities, or the dangers that Scottish mountains pose for even experienced mountaineers.

MARTIN BELL
Dunfermline, Scotland

Atlantic Salmon

As a longtime environmentalist and aquaculture consultant, I find no difficulty in commingling my profession and my love for the planet. Atlantic salmon are in trouble, but your article laid far too much blame at the feet of aquaculture. Many people seem bent on pitting aquaculture against environmentalism. Aquaculture was conceived as a response to the destruction caused by overfishing. Aquaculture is not perfect—no one claims that it is. But an unbiased assessment of costs versus benefits places aquaculture squarely in the plus column.

BILL MANCI
Fort Collins, Colorado

It turned my stomach to read what salmon are fed, what they're exposed to, and that

WRITE TO FORUM

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pigments are added to their food to fool consumers as to where the salmon really came from. The title of the article was "Everybody Loves Atlantic Salmon." I don't think so!

D. E. RODRIGUEZ
Phoenix, Arizona

Readers should not stop eating salmon. They should fight for better management of fish farming instead. Without fish farming, poaching of wild salmon will increase, along with drift netting and longline fishing for wild salmon on the high seas.

THORSTEINN THORSTEINSSON
Borgarnes, Iceland
FROM OUR ONLINE FORUM
nationalgeographic.com/ngm/0307

I love salmon, and I eat it regularly. Maybe the farmed fillets aren't quite as exquisite as the wild ones. I wouldn't know, because my middle-class family couldn't afford salmon when I was a kid in the good old days before aquaculture. What a shame that the sport of lords and affluent tourists is being disturbed by the hoi polloi feasting on fish.

CHRIS INDECH
Norcross, Georgia

Flashback

Flashback features a picture of my great-grandfather's brother, Yun Ung-ryeol of Korea, and his son Yun Chi-ho. The piece ends with a sentence indicating that many remember Yun Chi-ho as a collaborator of the Japanese in his last years, despite the fact that he was a fervent nationalist during most of the Japanese occupation of Korea from 1910 to 1945. This story is accurate, but it ignores Yun's tremendous contributions to Korea. He introduced to Korea the Southern Methodist Church, the YMCA, the game of basketball, and the bicycle. He founded numerous orphanages and schools and was the president of many higher educational institutions. He published the first hymnbook and the first English-Korean dictionary in Korea. Some believe that he wrote the verses of the Korean national anthem. Incidentally, Yun Bo-seon, his nephew and my uncle, became the president of the Republic of Korea in 1960, continuing Yun Chi-ho's legacy.

CHUL KOO YUN
Raleigh, North Carolina

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the leader.



Korea's DMZ

Thank you for showing us how things have changed in the zone in the past 50 years. It is amazing to see how sophisticated the tools of defense have become since the days we members of the First Marine Division trooped the Demarcation Line from August 1953 through February 1955. Each of us carried a rifle and a pistol, and the "barrier" between friendly and enemy territory was a piece of cloth tape stretched between warning signs. The barrier fences, the bunkers, and the floodlights now in place along the DMZ make it look like a macabre Disneyland.

R. D. CAULKINS
Brunswick, Georgia

The photo of the North Korean soldier's "war face" on page 7 took me back to my DMZ tour when I came eye to eye with just such a look. We were carefully warned that crossing the border would get us shot, but one place where border crossings were permitted for noncombatants was inside the small negotiations building in Panmunjom. The hateful scowl of a North Korean guard there unnerved me as I took one cautious step into North Korea. Was this monster going to shoot me dead? Had I single-handedly shattered the delicate peace on the Korean peninsula? My fears must have been clear to the soldier peering into my eyes. He smiled and held back an urge to chuckle in amusement. Then his eyes quickly shot to his furious superior. The guard's countenance fell as he realized what he had done: For a moment, he forgot to hate.

JASON HOWARD
Fort Worth, Texas

Although Tom O'Neill's article is largely about the military, it cannot hide what seems to be the greater reality: The people of Korea, including the soldiers, do not want to fight. They are being held captive by governments that insist on a legacy of fear and pain.

SHILAH GOULD
Port Townsend, Washington

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Thank you for the informative article on Korea's DMZ. I was stationed at an air base in South Korea for a year. When I first arrived, the history of the tension and conflict between the two nations was emphasized to newcomers. This impressed upon us the importance of our presence, and the importance of giving 110 percent on the job every day. Unfortunately this wore off, and we reverted to our stateside view of Korea, not as a political hot spot but as a place as likely to see combat as our hometowns. I hope that our troops in Korea were able to read this article and regain their sense of mission.

NINA A. BRITTON
U.S. Air Force
Landstuhl, Germany

I don't understand why we are still in Korea after 50 years. Surely there are enough capable South Korean soldiers to take care of the DMZ.

RUTH R. DAVIS
Denver, Colorado

During a visit to Seoul in the 1980s I took a day trip to the DMZ and Panmunjom. We were able to visit the building in which meetings between the North and South were conducted. The borderline was painted across the middle of the room. It seemed that a bunch of five-year-olds were running the place. Competing propaganda messages were screamed out over public-address systems on both sides of the border. I also learned that diplomats argued over whose flag on the table was larger and that there had been competition over which side flew the largest outdoor flag on the highest flagpole. Panmunjom is a symbol of men's (and governments') immaturity, insensitivity, and unwillingness to behave as

gentlemen—or even adults. It was fascinating, but ridiculous.

LINNEA BUCHER
Manhattan Beach, California

I would have liked your story to include a bit more information about the growing resentment among South Korean citizens regarding the U.S. military presence and the confrontational attitude of the U.S. government. One photo and two sentences in the text on this subject are not quite enough to understand why Koreans feel this way.

JAN HEINE
Seattle, Washington

ZipUSA: Peru, Indiana

I'm so pleased that the circus is still around. My daughter performed with the circus for three years while we lived nearby at Grissom Air Force Base. Her father was one of the riggers, and I helped the younger children with makeup backstage. It's a wonderful experience for

families—especially the children. There's a lot of hard work involved, and many parents volunteer many hours of their time. We'll never forget little Peru.

LIZ NORRIS
Hattiesburg, Mississippi

Who Knew?

Lynne Warren's *It Matters* column about Israeli engineer Gavriel Iddan's capsule endoscope, a pill-size device used for imaging the inside of the gastrointestinal tract, was fascinating. My only question is: When the device has completed its mission, is it simply expelled and forgotten about, or is it retrieved, cleansed, and swallowed again by some other person?

JIM PEARSON
Chandler, Arizona

The capsule endoscope is a disposable device. After transmitting data to sensors worn by the patient, it's expelled—never, we presume, to be seen again.

Bronze Age China

I couldn't help noticing the couple that was publicly cavorting in the foreground of the photo on page 70. Surely the photographer could have waited until the couple was finished. Or perhaps this photograph should have been

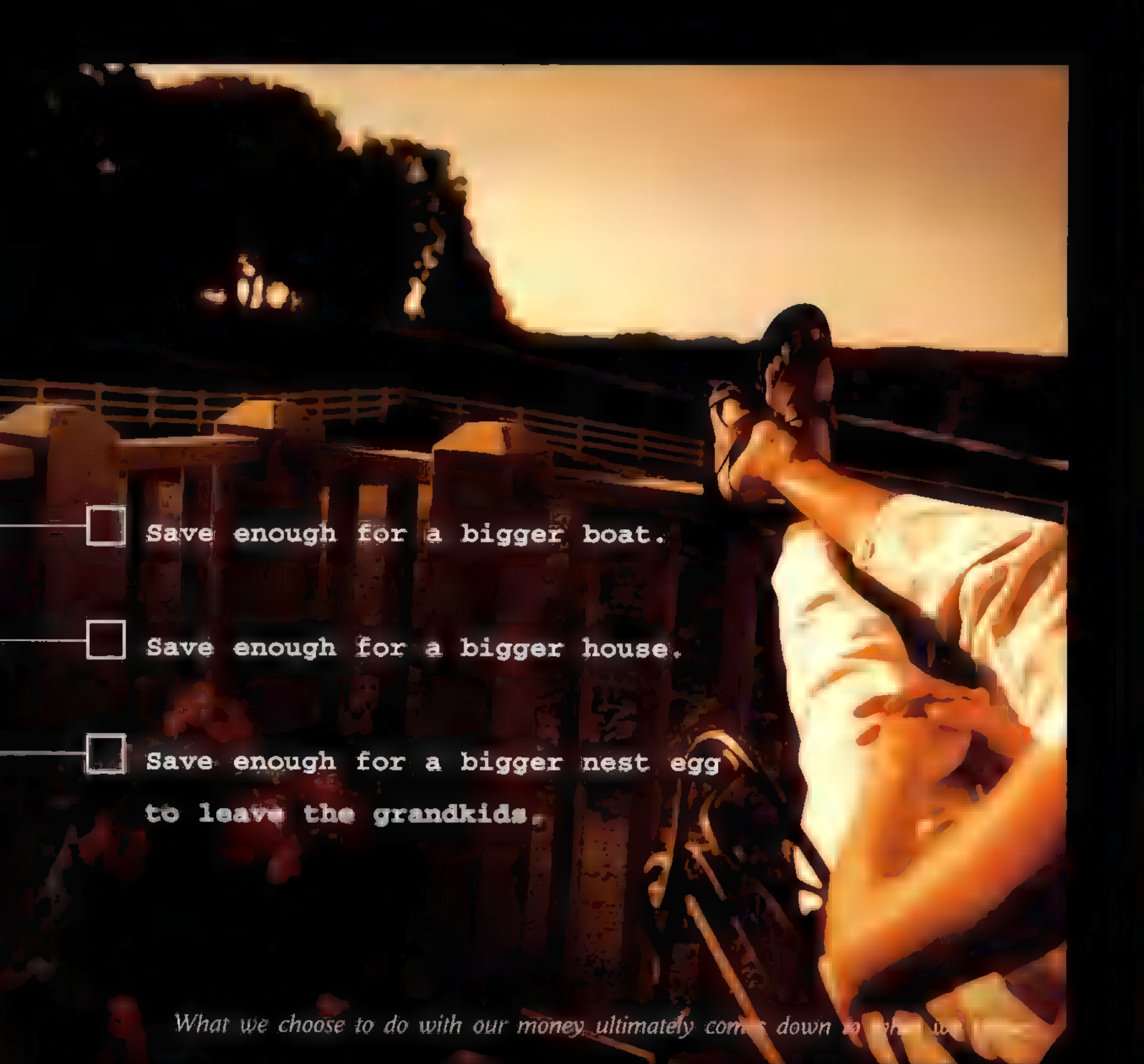
part of the previous article on the animal mating game. The photograph was tasteless.

CYNTHIA J. ZIZZI
Cos Cob, Connecticut

The photographer reports that the couple in question are two boys wrestling.



ROBERT CLARK

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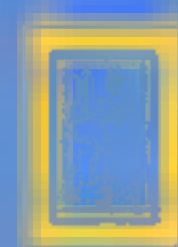
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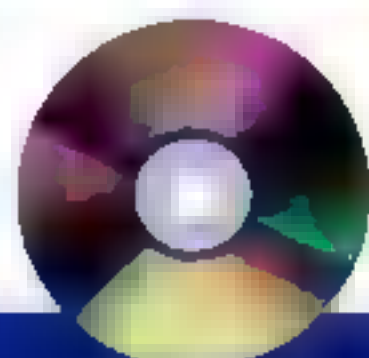
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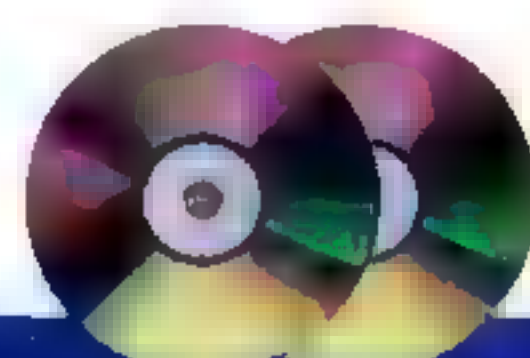
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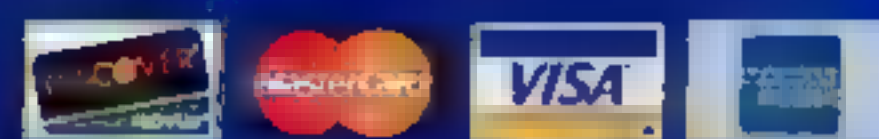
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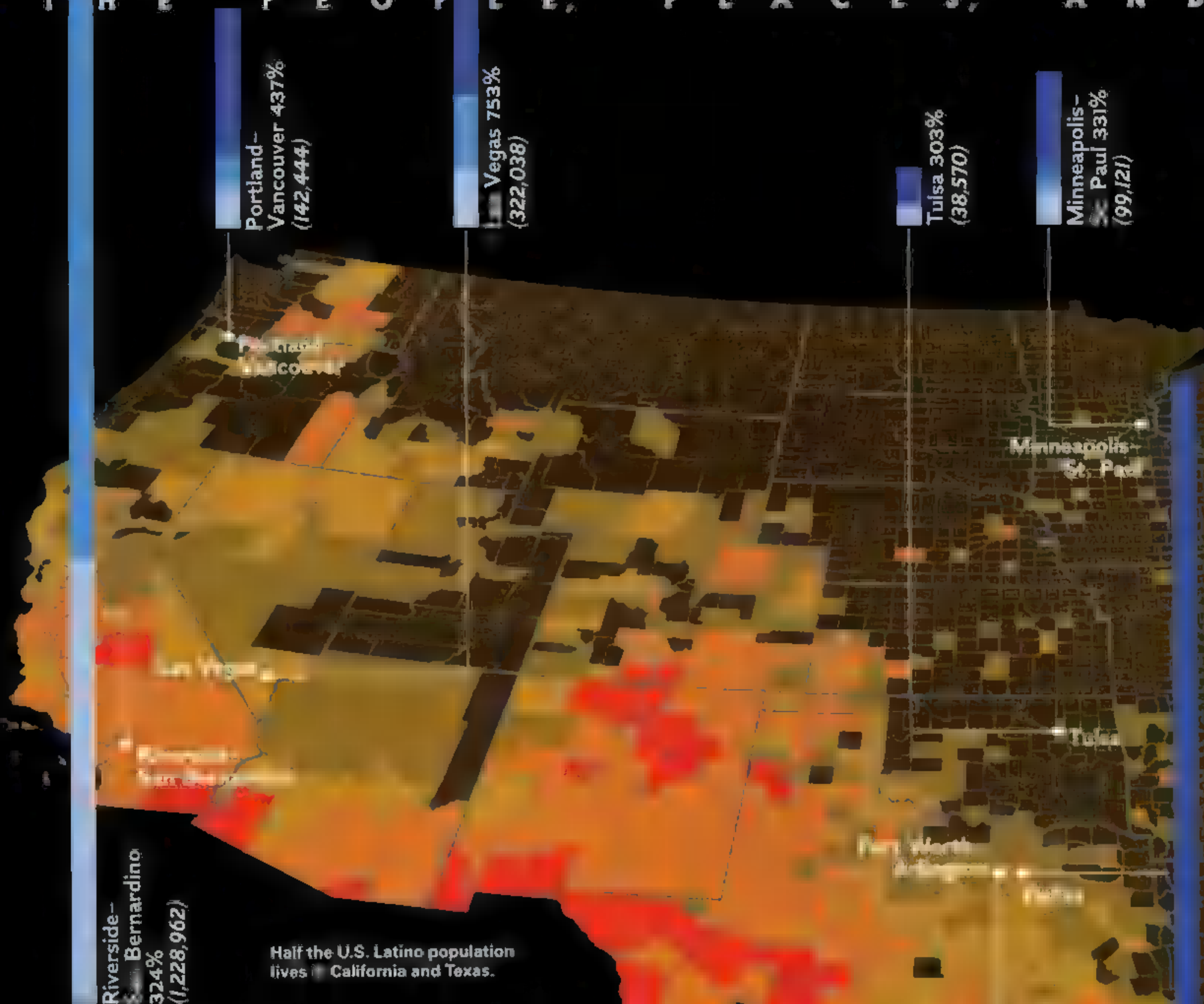
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DEMOGRAPHICS

Latinos Rise Nationwide

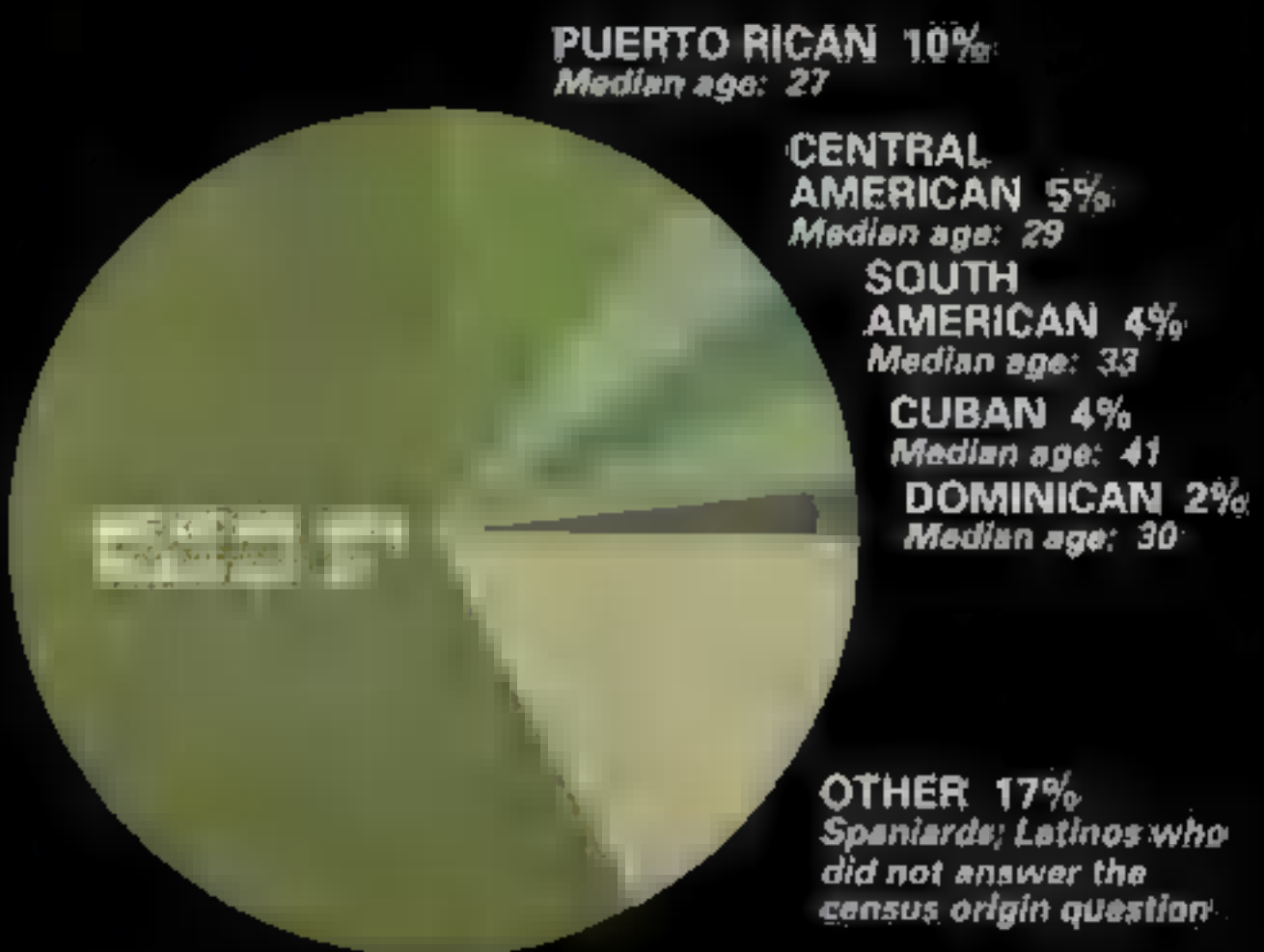
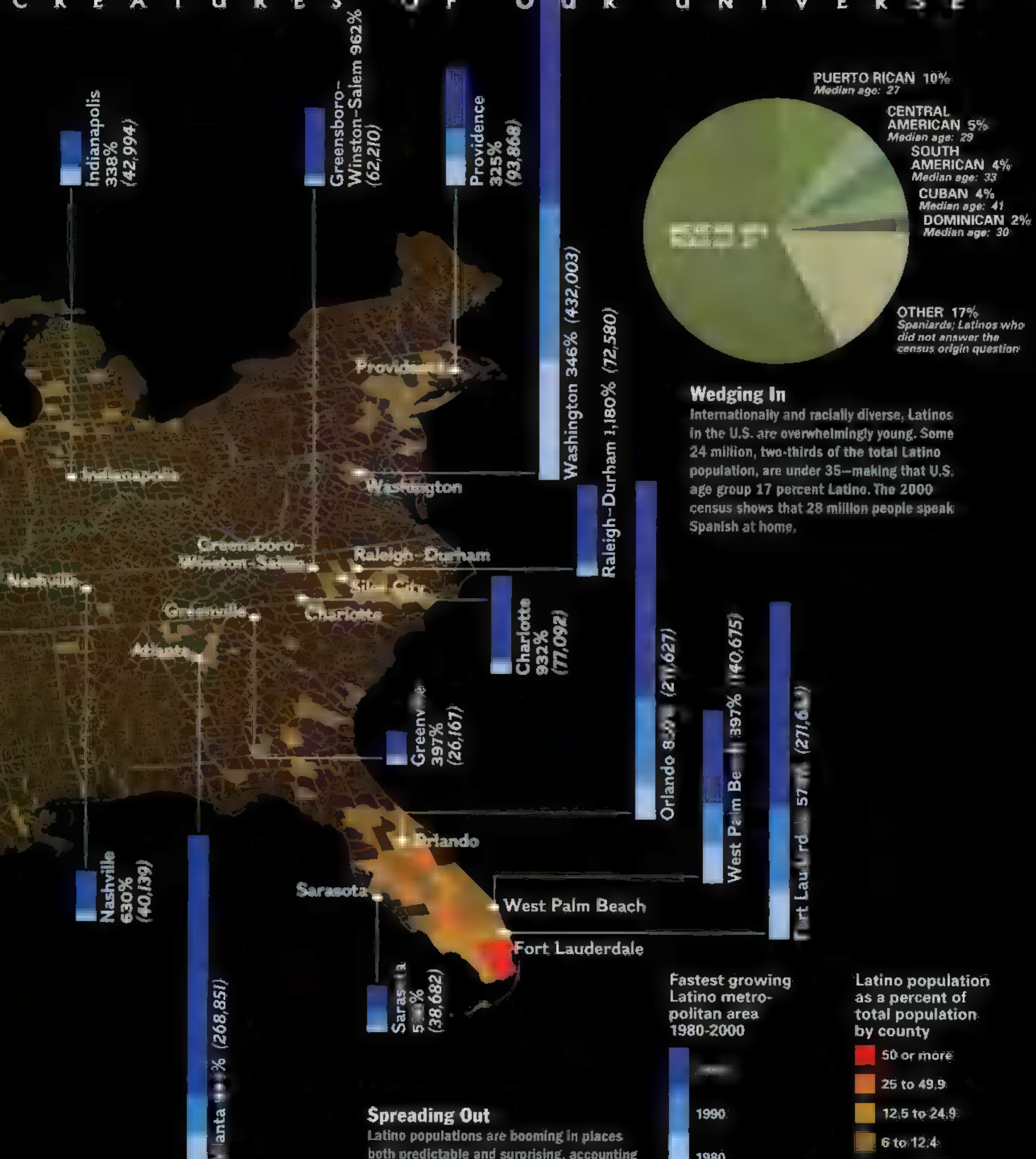
America's new majority minority

It's official. Latinos have overtaken African Americans as the largest minority in the U.S., a milestone the Census Bureau had seen coming but didn't expect so soon. Numbering 38.8 million, Latinos now make up 13 percent of the nation's demographic total. With high birthrates and immigration—legal and illegal—swelling their ranks, Latinos have more than doubled

their presence in the U.S. in the past two decades and added 3.5 million to their count just since the 2000 census. In areas where they are most populous—the West and Southwest and the cities of New York, Miami, and Chicago—they've already influenced local culture. Now, as they follow jobs and lifestyles into the American heartland, they're changing the fabric of the entire country.

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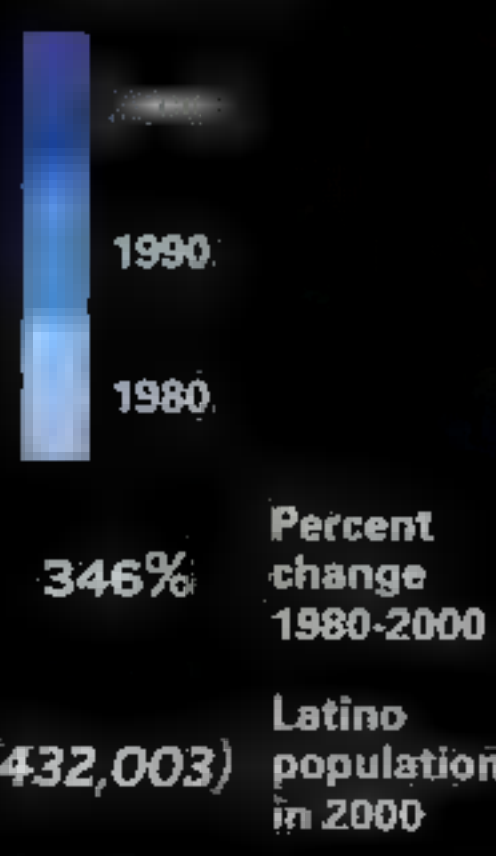
Wedging In

Internationally and racially diverse, Latinos in the U.S. are overwhelmingly young. Some 24 million, two-thirds of the total Latino population, are under 35—making that U.S. age group 17 percent Latino. The 2000 census shows that 28 million people speak Spanish at home.

Spreading Out

Latino populations are booming in places both predictable and surprising, accounting for 39 percent of U.S. growth since 1980. In areas where Latinos have long been established, their numbers continue to soar. But many of the top 20 metro areas experiencing the most explosive Latino growth (blue bars) are far from the traditional strongholds of Texas and southern California.

Fastest growing Latino metropolitan area 1980-2000



SOURCES: BROOKINGS INSTITUTION; CENTER ON URBAN AND METROPOLITAN POLICY; PEW HISPANIC CENTER, AND U.S. CENSUS BUREAU; NATIONAL GEOGRAPHIC MAPS



ANNIE GRIFFITHS-BELT (BOTH)

A case in point: Siler City, North Carolina, close to the Raleigh-Durham hub that has seen a phenomenal 1,180 percent rise in its Latino population since 1980. At Siler City's new adobe-style church, St. Julia's, where flowers share garden space with jalapeño peppers, Friar Michael Lorentsen (below) ministers to a thousand parishioners, most Spanish speaking. A dozen years ago a 125-seat Catholic church was big enough for this small southern town, whose population was then about 70 percent white, 30 percent black. Today 40 percent are Latinos, lured here by jobs, especially in poultry processing.

"Siler City would be a dry place in the middle of a mud puddle if it weren't for them," says

Bob Hall (above). His produce store serves a mostly Latino clientele, many of whom are living in and revitalizing a neighborhood of former textile factories. "We came here for our children, to give them a better life, a better future," says a customer originally from Mexico. "There weren't the same opportunities for them back home, or work for me." Most Siler City Latinos earn low wages, and many hold two jobs, but they're making their version of the American dream come true as they buy cars, homes, and other middle-class comforts.

Similar stories are playing out across the country, adding new tastes, sounds, and traditions to mainstream America. A Kalamazoo, Michigan, bakery specializes in Mexican pastries. A Spanish-language radio station broadcasts from Grand Island, Nebraska. Anchorage, Alaska, celebrates Mexico's Cinco de Mayo holiday. Big business is paying attention too. Companies like Häagen-Dazs and Kmart are creating products for Latino customers—and profiting from the products' crossover appeal to the general consumer.

Store displays, websites, and

packaging increasingly appear in both Spanish and English. Ten years ago the Eder Flag Manufacturing Company decided to offer the Stars and Stripes in a bilingual wrapper. The results have been overwhelmingly positive. "Latinos want to fly the flag too," says marketing director Jim Kowalewski. "Even the ones who can't yet speak English are proud of America." —A. R. Williams

Strength in Numbers

The Latino population's extraordinary growth rate—9.8 percent from 2000 to 2002, four times the national average—gives it increasing marketplace clout.

Purchasing power 653 billion dollars a year, a 194 percent increase since 1990.

Growing middle class 80 percent increase, more than three times the national average, since 1980.

Company ownership 6 percent of U.S. companies are Latino owned.

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JOSE LUIS SAAVEDRA, REUTERS

MARINE BIOLOGY

Dissecting the Blob

Beached and bloated, it still tells a tale

Mystery solved: The gelatinous blob that oozed onto a Chilean beach last June rumored to be a giant octopus was nothing of the sort. Paolo Sanino of Chile's Centre for Marine Mammals Research Leviathan says the skin, blubber, blowhole, and muscle—dark from a protein found in deep divers—gave it away as a sperm whale's remains.

When a sperm whale dies at sea, the body fills with gas, floats like a balloon, and its insides "turn into a sort of cream," Sanino says. The skin splits, "the gas is released, and the bones fall out, leaving the skin, blubber, and forehead." And the smell? "It stays with you for days," he says.

In this case cause of death isn't clear. "The carcass drew so much attention and mishandling that vital clues were lost," Sanino says. But fishermen illegally kill some sperm whales each year, saying that the whales are stealing their catch—Patagonian toothfish (aka Chilean sea bass). "Some fishermen don't like the killing," Sanino says, "so we're working together toward a solution."

Normally squid-eaters, sperm whales only recently began raiding toothfish lines, the fishermen say. Are squid so depleted from overharvesting as to force the whales to switch prey? The answer is out there. Sanino's looking.

—Jennifer Steinberg Holland

SIGNS

What World's first elk-activated crosswalk sign.

Where Alongside U.S. 101, near Sequim, Washington.

How Eight elk outfitted with radio collars trigger flashing lights, warning motorists when their herd nears the highway.

Why More than a dozen smashups occurred in six years along ■ stretch the elk frequent. The number has fallen to zero since signs were installed.

Who Shelly Ament, wildlife biologist (and former electrician) spearheaded the project. Her message: "Stay alert, and slow down!"



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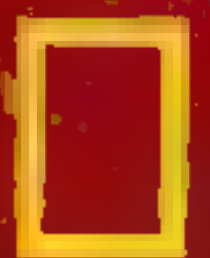
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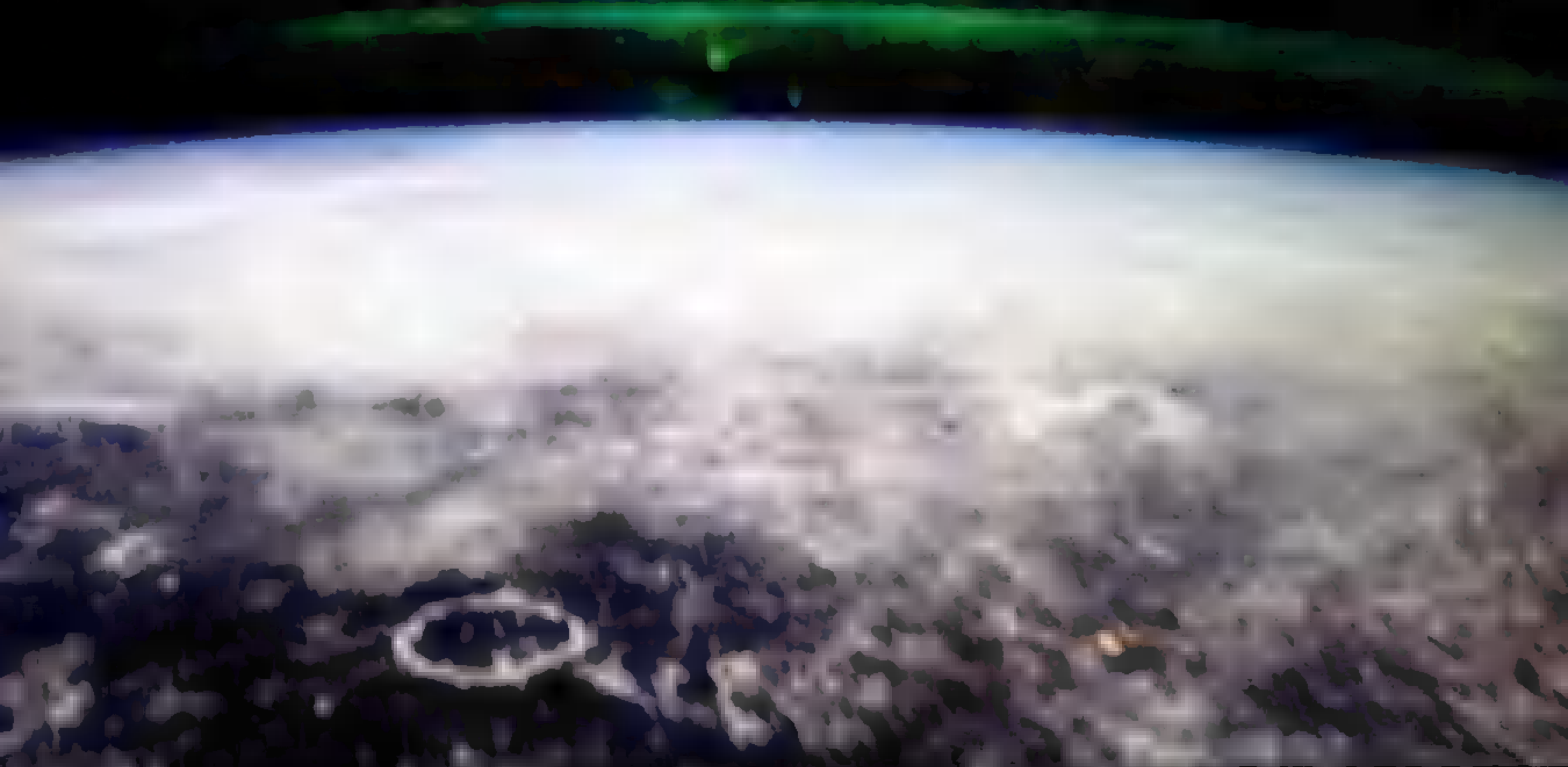


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Shooting in Space

NG photographers help astronauts get the picture

How do you take a decent photograph of an aurora borealis's green glow from space? "Practice," says International Space Station astronaut Don Pettit (right, at center on TV screen)—and with some advice from grounded pros. As Don and his fellow astronauts, Ken Bowersox and Nikolai Budarin, right and left, orbited 240 miles above the planet, they got that advice via satellite connection from veteran photographers Cary Wolinsky, left, and Bob Caputo. Cary and Bob have frequently shared their photo expertise with viewers on the National Geographic Channel.



DON PETTIT (TOP); BOB CAPUTO AND CARY WOLINSKY

Since the space station travels 17,500 miles an hour, it passes over eight miles of Earth's surface every second. "So you have to track your lens," says Bowersox. And try to stand still in zero gravity. Dirty windows blur pictures, and even small amounts of radiation can harm film. Shooting outside in bulky suits, helmets,

and gloves, with insulated cameras, is even harder. The chances of changing film? Zilch.

But space photography has its advantages. "Astronauts have a view we're never going to get," says Cary. Plus, lugging heavy camera gear is a cinch without gravity. "It makes us earthbound guys very envious," Bob says.



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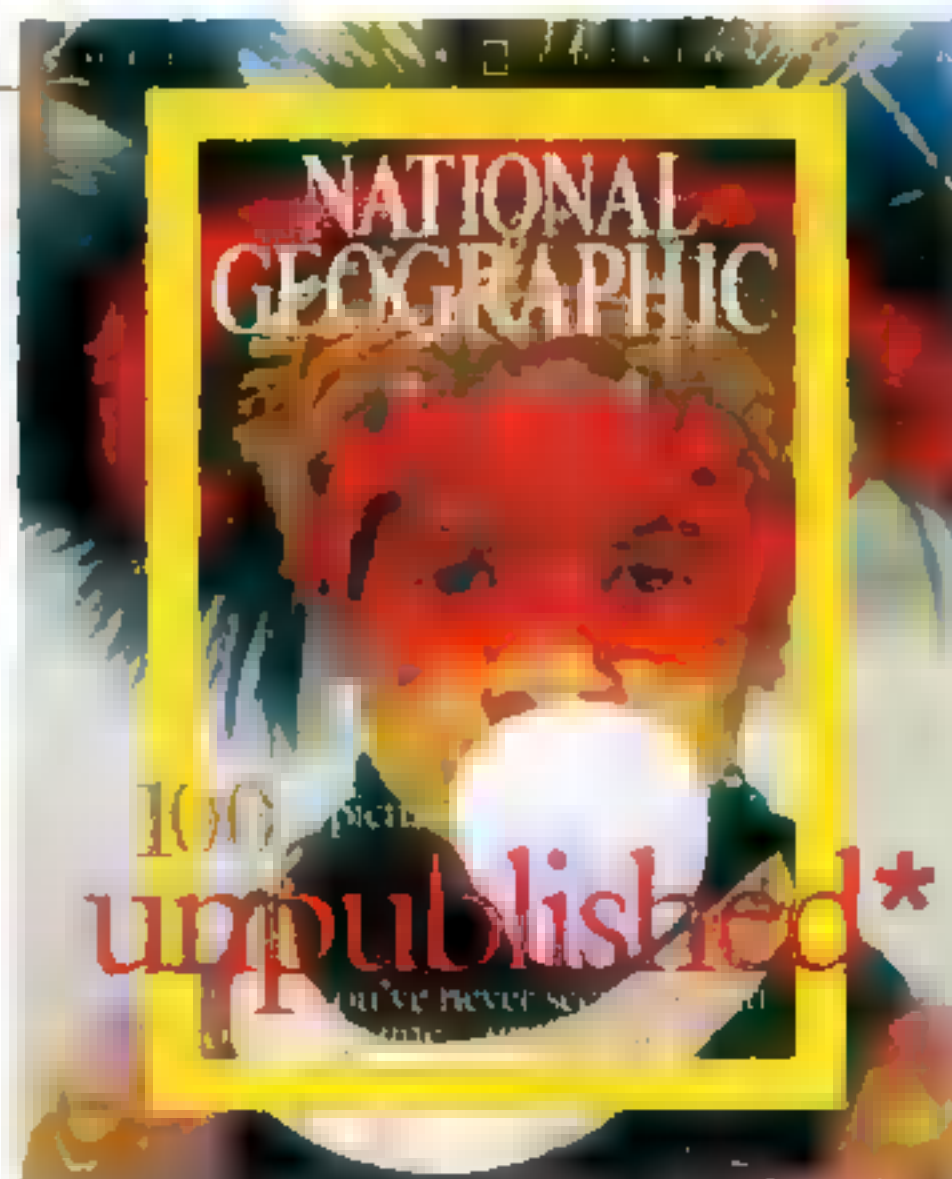
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with only so many pages in the magazine, lots of gems fall on the editing room floor each month. So we asked our photographers to submit their best unpublished work. We've selected our favorites and added notes by the photographers. The issue will be available November 1 on newsstands or at nationalgeographic.com/ngm/bestunpublished.



Geography in the Genes

National Geo Bee is a family affair

Penny and Gary Beihl seem to have a knack for producing geographically precocious kids. All three of their homeschooled children—David, Debbie, and Thomas (below, left to right)—have won the South Carolina geography bee championship and gone on to compete with other state winners in the National Geographic Bee, held at Society headquarters in Washington, D.C.

In 1999 David, the eldest, won the national championship, now sponsored by ING and in its

15th year, and the accompanying \$25,000 scholarship. (This year's winner was James Williams of Vancouver, Washington.) David credited part of his success to a last minute cram session. The day before the Bee, his mother quizzed him about places in Central America and asked about the Gulf of Fonseca. David didn't know the answer then, but he did when he got onstage—and was questioned about the very same Pacific gulf. "I had prayed to study the right thing, and we did," David recalls.

Two years after David's victory, brother Thomas won the state competition and competed in Washington as well. Debbie Beihl followed in her brothers' footsteps, coming to the finals not once but twice—after winning the state championship last year and again this year.



NEIS PHOTOGRAPHER MARK THIESSEN

Bee Prep, Beihl Style

Here are some tips from the family of champions:

Do Hang maps around the house for subconscious absorption of geographic facts.

Don't Watch TV (except local Bee coverage, of course).

Do Practice, practice, practice. Study one-on-one with parents, siblings, and teachers. Try for daily breakfast quizzes and spend extra time studying as the Bee approaches.

Don't Get caught off guard by the stress of public speaking. Practice getting up in front of strangers by playing an instrument, entering contests, and making speeches.

Do Exercise the day before the Bee to help ensure a good night's sleep.

Don't Eat sweets before the Bee; they might make it harder for you to think clearly. And don't talk to other kids during the Bee itself—you'll be distracted.

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YELLOWSTONE/GRAND TETONS (PAGE 104)

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■ **Wolves: A Legend Returns to Yellowstone** on the National Geographic Channel, November 9, 9 p.m. ET/PT. Join the pack as gray wolves are reintroduced to Yellowstone. See the demise of an alpha male and watch how a sisterly rivalry leaves a wolf out in the cold.

■ **Hawks Rest: A Season in the Remote Heart of Yellowstone** Author Gary Ferguson recounts his three months living among wolves and grizzlies and meeting hunters, hikers, park rangers, scientists, and outfitters—all trying to preserve a slice of wilderness (\$15).



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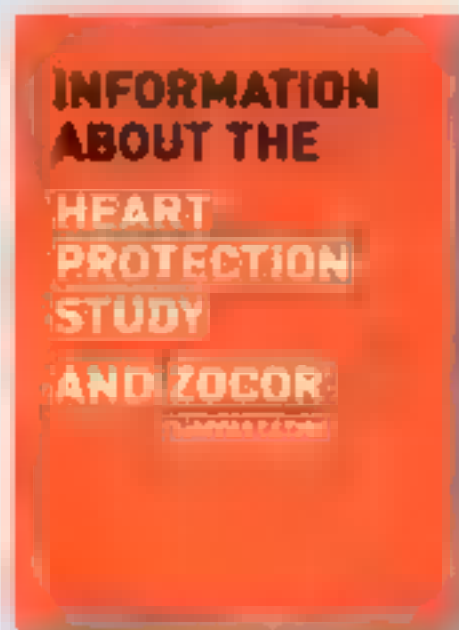
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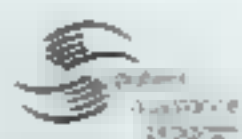
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(SIMVASTATIN)

PLEASE READ THIS SUMMARY CAREFULLY, THEN ASK YOUR DOCTOR ABOUT ZOCOR. NO ADVERTISEMENT CAN PROVIDE ALL THE INFORMATION NEEDED TO PRESCRIBE A DRUG. THIS ADVERTISEMENT DOES NOT TAKE THE PLACE OF CAREFUL DISCUSSIONS WITH YOUR DOCTOR. ONLY YOUR DOCTOR HAS THE TRAINING TO WEIGH THE RISKS AND BENEFITS OF A PRESCRIPTION DRUG FOR YOU.

USES OF ZOCOR

ZOCOR is a prescription drug that is indicated as an addition to diet for many patients with high cholesterol. For patients at high risk of coronary heart disease (CHD) because of existing heart disease, diabetes, vascular disease, or history of stroke, ZOCOR is indicated along with diet to reduce the risk of death by reducing coronary death; reduce the risk of heart attack and stroke; and reduce the need for revascularization procedures.

WHEN ZOCOR SHOULD NOT BE USED

Some people should not take ZOCOR. Discuss this with your doctor.

ZOCOR should not be used by patients who are allergic to any of its ingredients. In addition to the active ingredient simvastatin, each tablet contains the following inactive ingredients: cellulose, lactose, magnesium stearate, iron oxides, talc, titanium dioxide, and starch. Butylated hydroxyanisole is added as a preservative.

Patients with liver problems: ZOCOR should not be used by patients with active liver disease or repeated blood test results indicating possible liver problems. (See WARNINGS.)

Women who are or may become pregnant: Pregnant women should not take ZOCOR because it may harm the fetus. **Women of childbearing age should not take ZOCOR unless it is highly unlikely that they will become pregnant.** If a woman does become pregnant while on ZOCOR, she should stop taking the drug and talk to her doctor once.

Women who are breast-feeding should not take ZOCOR.

WARNINGS

Muscle: Tell your doctor right away if you experience any unexplained muscle pain, tenderness, or weakness at any time during treatment with ZOCOR so your doctor can decide if ZOCOR should be stopped. Some patients may have muscle pain or weakness while taking ZOCOR. Rarely, this can include muscle breakdown resulting in kidney damage. The risk of muscle breakdown is greater in patients taking certain other drugs along with ZOCOR:

- Cyclosporine, itraconazole, ketoconazole, erythromycin, clarithromycin, HIV protease inhibitors, the antidepressant nefazodone, or large quantities of grapefruit juice (>1 quart daily), particularly with higher doses of ZOCOR.
- Gemfibrozil, other fibrates, or lipid-lowering doses (≥ 1 g/day) of niacin, particularly with higher doses of ZOCOR.
- Amiodarone or verapamil with higher doses of ZOCOR.

The risk of muscle breakdown is greater at higher doses of simvastatin.

Because the risk of muscle side effects is greater when ZOCOR is used with the products listed above, the combined use of these products should be avoided unless your doctor determines the benefits are likely to outweigh the increased risks.

If your doctor determines that the benefits of combined use of ZOCOR with gemfibrozil, other fibrates, or niacin likely outweigh the increased risk of muscle problems, the dose of ZOCOR should not exceed 10 mg daily. No more than 10 mg/day of ZOCOR should be taken with cyclosporine.

The combined use of verapamil or amiodarone with doses above ZOCOR 20 mg should be avoided unless your doctor determines the benefits outweigh the increased risk of muscle breakdown.

Your doctor should also carefully monitor for any muscle pain, tenderness, or weakness, particularly during the initial months of therapy and if the dose of either drug is increased. Your doctor also may monitor the level of certain muscle enzymes in your body, but

there is no assurance that such monitoring will prevent the occurrence of severe muscle disease.

The risk of muscle breakdown is greater in patients with kidney problems or diabetes.

If you have conditions that can increase your risk of muscle breakdown, which in turn can cause kidney damage, your doctor should temporarily withhold or stop ZOCOR (simvastatin). Also, since there are no known adverse consequences of briefly stopping therapy with ZOCOR, treatment should be stopped a few days before elective major surgery and when any major acute medical or surgical condition occurs. Discuss this with your doctor, who can explain these conditions to you.

Liver: About 1% of patients who took ZOCOR in clinical trials developed elevated levels of some liver enzymes. Patients who had these increases usually had no symptoms. Elevated liver enzymes usually returned to normal levels when therapy with ZOCOR was stopped.

In the ZOCOR Survival Study, the number of patients with more than 1 liver enzyme level elevation to greater than 3 times the normal upper limit was no different between the ZOCOR and placebo groups. Only 8 patients on ZOCOR and 5 on placebo discontinued therapy due to elevated liver enzyme levels. Patients were started on 10 mg of ZOCOR, and one third had their dose raised to 40 mg.

Your doctor should perform routine blood tests to check these enzymes before you start treatment with ZOCOR and thereafter when clinically indicated. Patients titrated to the 80-mg dose should receive an additional test at 3 months and periodically thereafter (eg, semiannually) for the first year of treatment. If your enzyme levels increase, your doctor should order more frequent tests. If your liver enzyme levels remain unusually high, your doctor should discontinue your medication.

Tell your doctor about any liver disease you may have had in the past and about how much alcohol you consume. ZOCOR should be used with caution in patients who consume large amounts of alcohol.

PRECAUTIONS

Drug Interactions: Because of possible serious drug interactions, it is important to tell your doctor what other drugs you are taking, including those obtained without a prescription. You should also tell other doctors who are prescribing a new medicine for you that you are taking ZOCOR. ZOCOR can interact with the following:

- Itraconazole
- Ketoconazole
- Erythromycin
- Clarithromycin
- HIV protease inhibitors
- Nefazodone
- Cyclosporine
- Large quantities of grapefruit juice (>1 quart daily)

The risk of myopathy is also increased by the following lipid-lowering drugs that can cause myopathy when given alone:

- Gemfibrozil
- Other fibrates
- Niacin (nicotinic acid) (≥ 1 g/day)

The risk of muscle breakdown is increased with other drugs:

- Amiodarone
- Verapamil

Some patients taking lipid-lowering agents similar to ZOCOR and coumarin anti-coagulants (a type of blood thinner) have experienced bleeding and/or increased blood clotting time. Patients taking these medicines should have their blood tested before starting therapy with ZOCOR and should continue to be monitored.

Central Nervous System Toxicity; Cancer, Mutations, Impairment of Fertility: Like most prescription drugs, ZOCOR was required to be tested on animals before it was marketed for human use. Often these tests were designed to achieve higher drug concentrations than humans achieve at recommended dosing. In some tests, the animals had damage to the nerves in the central nervous system. In studies of mice with high doses of ZOCOR, the likelihood of certain types of cancerous tumors increased. No evidence of mutations or damage to genetic material has been seen. In 1 study with ZOCOR, there was decreased fertility in male rats.

Pregnancy: Pregnant women should not take ZOCOR because it may harm the fetus.

Safety in pregnancy has not been established. In studies with lipid-lowering agents similar to ZOCOR, there have been rare reports of birth defects of the skeleton and digestive system. Therefore, women of childbearing age should not take

ZOCOR[®] (simvastatin) unless it is highly unlikely they will become pregnant. If a woman does become pregnant while taking ZOCOR, she should stop taking the drug and talk to her doctor once. The active ingredient of ZOCOR did not cause birth defects in rats at 3 times the human dose or in rabbits at 3 times the human dose.

Nursing Mothers: Drugs taken by nursing mothers may be present in their breast milk. Because of the potential for serious adverse reactions in nursing infants, a woman taking ZOCOR should not breast-feed. (See WHEN ZOCOR SHOULD NOT BE USED.)

Pediatric Use: ZOCOR is not recommended for children or patients under 10 years of age.

Geriatric Use: Higher blood levels of active drug were seen in elderly patients (70–78 years of age) compared with younger patients (18–30 years of age) in 1 study. In other studies, the cholesterol-lowering effects of ZOCOR were at least as great in elderly patients as in younger patients, and there were no overall differences in safety between elderly and younger patients over the 20–80 mg/day dosage range. Of the 7 cases of myopathy/rhabdomyolysis among 10,269 patients on ZOCOR in another study, 4 were aged 65 or more (at baseline), 1 of whom was over 75.

SIDE EFFECTS

Most patients tolerate treatment with ZOCOR well; however, like all prescription drugs, ZOCOR can cause side effects, and some of them can be serious. Side effects that do occur are usually mild and short-lived. Only your doctor can weigh the risks versus the benefits of any prescription drug. In clinical studies with ZOCOR, less than 1.5% of patients dropped out of the studies because of side effects. In 2 large, 5-year studies, patients taking ZOCOR experienced similar side effects to those patients taking placebo (sugar pills). Some of the side effects that have been reported with ZOCOR or related drugs are listed below. This list is not complete. Be sure to ask your doctor about side effects before taking ZOCOR and to discuss any side effects that occur.

Digestive System: Constipation, diarrhea, upset stomach, gas, heartburn, stomach pain/cramps, anorexia, loss of appetite, nausea, inflammation of the pancreas, hepatitis, jaundice, fatty changes in the liver, and, rarely, severe liver damage and failure, cirrhosis, and liver cancer.

Muscle, Skeletal: Muscle cramps, aches, pain, and weakness; joint pain; muscle breakdown.

Nervous System: Dizziness, headache, insomnia, tingling, memory loss, damage to nerves causing weakness and/or loss of sensation and/or abnormal sensations, anxiety, depression, tremor, loss of balance, psychic disturbances.

Skin: Rash, itching, hair loss, dryness, nodules, discoloration.

Eye/Senses: Blurred vision, altered taste sensation, progression of cataracts, eye muscle weakness.

Hypersensitivity (Allergic) Reactions: On rare occasions, a wide variety of symptoms have been reported to occur either alone or together in groups (referred to as a syndrome) that appeared to be based on allergic-type reactions, which may rarely be fatal. These have included 1 or more of the following: a severe generalized reaction that may include shortness of breath, wheezing, digestive symptoms, and low blood pressure and even shock; an allergic reaction with swelling of the face, lips, tongue, and/or throat with difficulty swallowing or breathing; symptoms mimicking lupus (a disorder in which a person's immune system may attack parts of his or her own body); severe muscle and blood vessel inflammation, sometimes including rash; bruises; various disorders of blood cells (that could result in anemia, infection, or blood clotting problems) or abnormal blood tests; inflamed or painful joints; hives; fatigue and weakness; sensitivity to sunlight; fever, chills; flushing; difficulty breathing; and severe skin disorders that vary from rash to a serious burn-like shedding of skin all over the body, including mucous membranes such as the lining of the mouth.

Other: Loss of sexual desire, breast enlargement, impotence.

Laboratory Tests: Liver function test abnormalities including elevated alkaline phosphatase and bilirubin; thyroid function abnormalities.

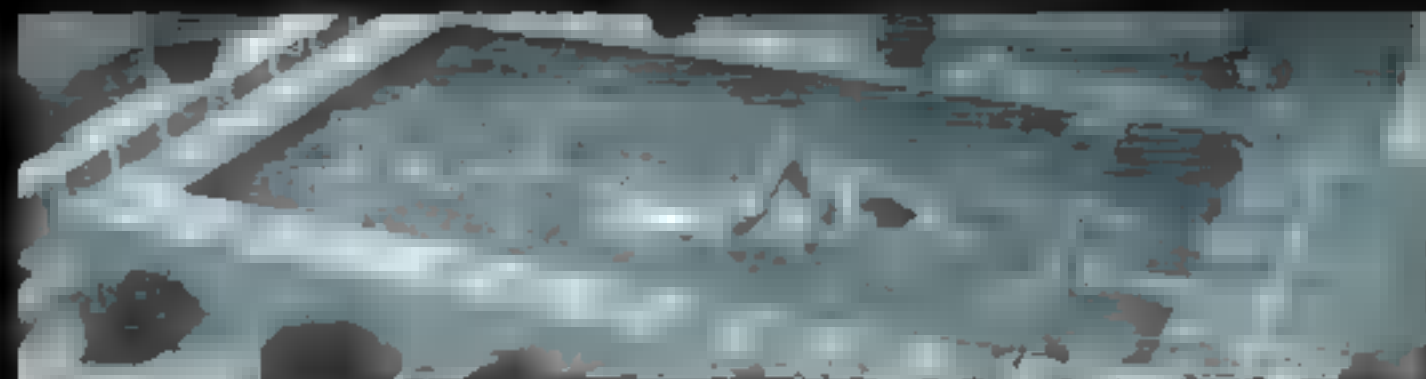
NOTE: This summary provides important information about ZOCOR. If you would like more information, ask your doctor or pharmacist to let you read the prescribing information and then discuss it with them.



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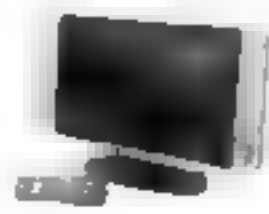
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Who Knew?

PATHOGENS

Our Friend, the Plague

Can germs keep us healthy?

Whenever a new disease appears somewhere on our planet, experts invariably pop up on TV with grave summations of the problem, usually along the lines of, "We're in a war against the microbes"—pause for dramatic effect—"and the microbes are winning."

War, however, is a ridiculously over-used metaphor and probably should be bombed back to the Stone Age.

Paul Ewald, a biologist at the University of Louisville, advocates a different approach to lethal microbes. Forget trying to obliterate them, he says, and focus instead on how they co-evolve with humans. Make them

mutate in the right direction. Get the powers of evolution on our side.

Disease organisms can, in fact, become less virulent over time. When it was first recognized in Europe around 1495, syphilis killed its human hosts within months. The quick progression of the disease—from infection to death—limited the ability of syphilis to spread. So a new form evolved, one that gave carriers years to infect others.

For the same reason, the common cold has become less dangerous. Milder strains of the virus—spread by people out and about, touching things, and shaking hands—have an evolutionary advantage over more debilitating strains. You can't spread

a cold very easily if you're incapable of rolling out of bed.

This process has already weakened all but one virulent strain of malaria: *Plasmodium falciparum* succeeds in part because bedridden victims of the disease are more vulnerable to mosquitoes that carry and transmit the parasite. To mitigate malaria, the secret is to improve housing conditions. If people put screens on doors and windows, and use bed nets, it creates an evolutionary incentive for *Plasmodium falciparum* to become milder and self-limiting. Immobilized people protected by nets and screens can't easily spread the parasite, so evolution would favor forms that let infected people walk around and get bitten by mosquitoes.

There are also a few high-tech tricks for nudging microbes in the right evolutionary direction. One company, called MedImmune, has created a flu vaccine using a modified

influenza virus that thrives at 77°F instead of 98.6°F, the normal human body temperature. The vaccine can be sprayed in a person's nose, where the virus survives in the cool nasal passages but not in the hot lungs or elsewhere in the body. The immune system produces antibodies that make the person better prepared for most normal, nasty influenza bugs.

Maybe someday we'll barely notice when we get colonized by disease organisms. We'll have co-opted them. They'll be like in-laws, a little annoying but tolerable. If a friend sees us sniffing, we'll just say, Oh, it's nothing—just a touch of plague.

—Joel Achenbach

WASHINGTON POST STAFF WRITER

IT MATTERS

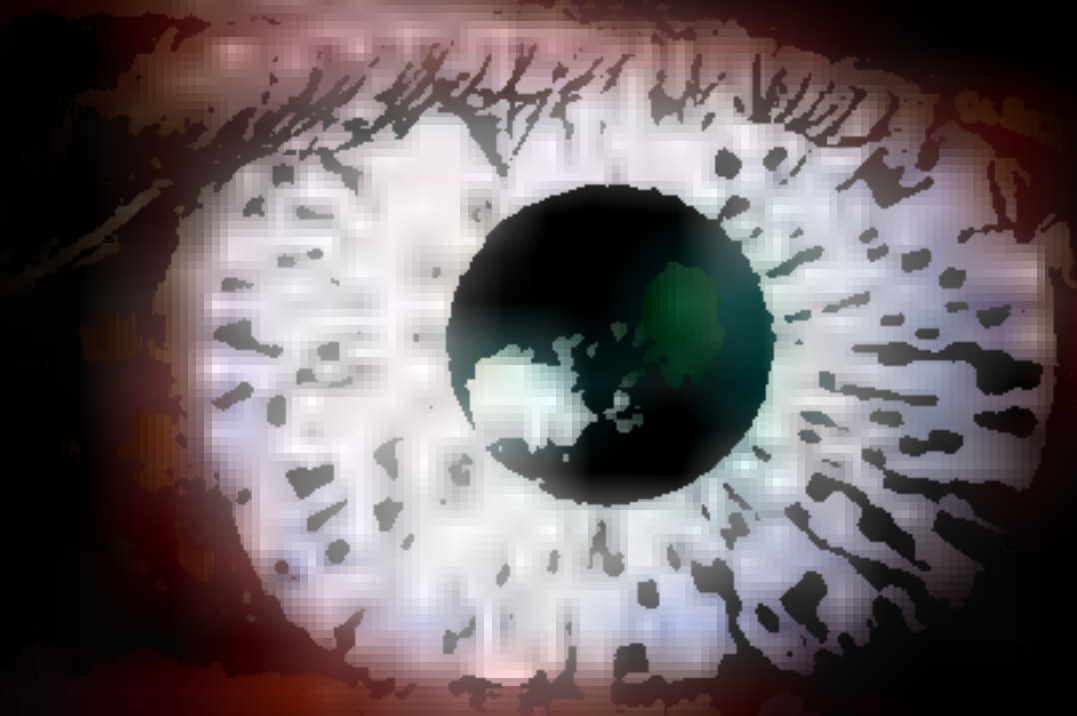
Flu kills an average of 36,000 people in the U.S. every year. That's more people than are killed by drunk drivers or gunshots. But unlike those calamities, flu can be prevented by a yearly vaccination. Despite widespread promotion of flu shots, immunization levels remain dismal even among high-risk populations. Less than 25 percent of people under 50 who suffer from chronic illness or have weakened immune systems get vaccinated. Among those over 65, a third go unprotected. According to University of Pittsburgh preventive medicine expert Dr. Richard Zimmerman, many fear the vaccine itself will make them sick. "But the viruses in flu shots are dead. They can't cause any kind of illness," he says. "It's especially tragic for a person to die of a disease that can be prevented by vaccination."

—Lynne Warren

WEBSITE EXCLUSIVE

Learn more about evolving pathogens—and find links to Joel Achenbach's work—at nationalgeographic.com/ngm/resources/0311.

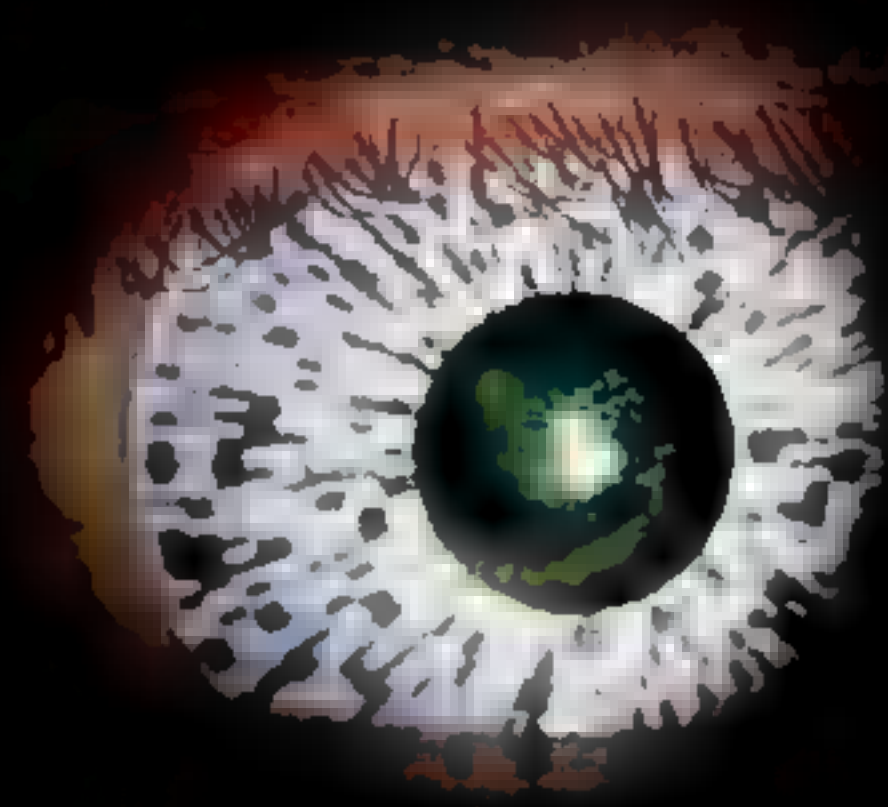
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exactly where you are, where one glance can
reveal exactly who you are. Sometime soon—
in an airport, in the lobby of your office,
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of your eyes and a computer reveal
your identity. For iris-recognition technology
you can thank the owner of this face,
computer scientist John Daugman
(he's wearing specially made contact lenses
imprinted with digital maps of his own irises).
His creation is just one of the technologies
revolutionizing public surveillance.

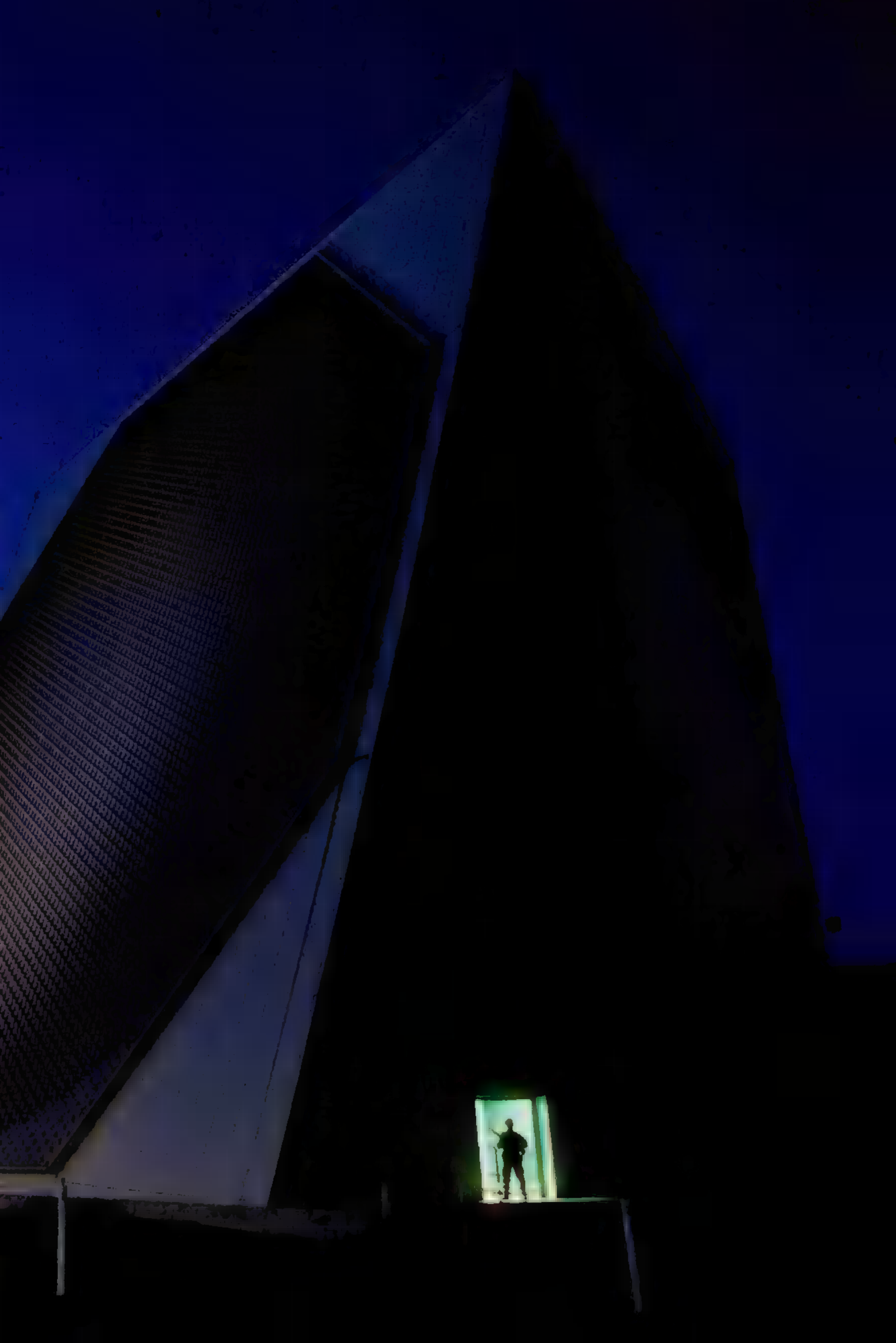
BY DAVID SHENK
PHOTOGRAPHS BY GEORGE STEINMETZ

**WE ARE HURTLING
TOWARD CONSTANT
ELECTRONIC SCRUTINY—
OF THE ENEMY AND
OF OURSELVES.**

COLD WAR ANTIQUITIES?

A ten-story radar station from 1979 still stands sentry on the Massachusetts coast, in case someone lobs a missile from the ocean. There are new threats in a post-9/11 world, where enemies are already inside borders and weapons as simple as box cutters can bring a nation to a standstill. A new key to security? Identifying the people who are a threat before they can act and finding weapons that once would have remained hidden.





P

aul Moskowitz would just love it if the frenetic, ever tinkering scientists supporting his counter-terrorism squad at Brookhaven National Laboratory bounded into his office one day and announced that they had come up with something half as good as a dog's nose.

“That is such an exquisite instrument,” he offers in a sandy voice tinged with humility. A trained dog can reliably detect the slightest

HIGH-TECH MEET MARKET



trace of a specific chemical—sometimes from a distance of many feet—even if the scent is masked by other pungent odors. For all the technological innovation in the 20th century, Moskowitz says, “we don’t have anything that can touch that yet.”

We’re sitting in his report-stacked office in rural Long Island, 70 miles from New York City, discussing the recently restored Grand Central Terminal in midtown Manhattan, one of the iconic centers of the civilized universe. As far as counterterrorism experts are concerned, Grand Central might as well have a giant red bull’s-eye painted on the floor: The station

seems that choice a target for the next large terrorist attack, or the next one after that, or the next one after that.

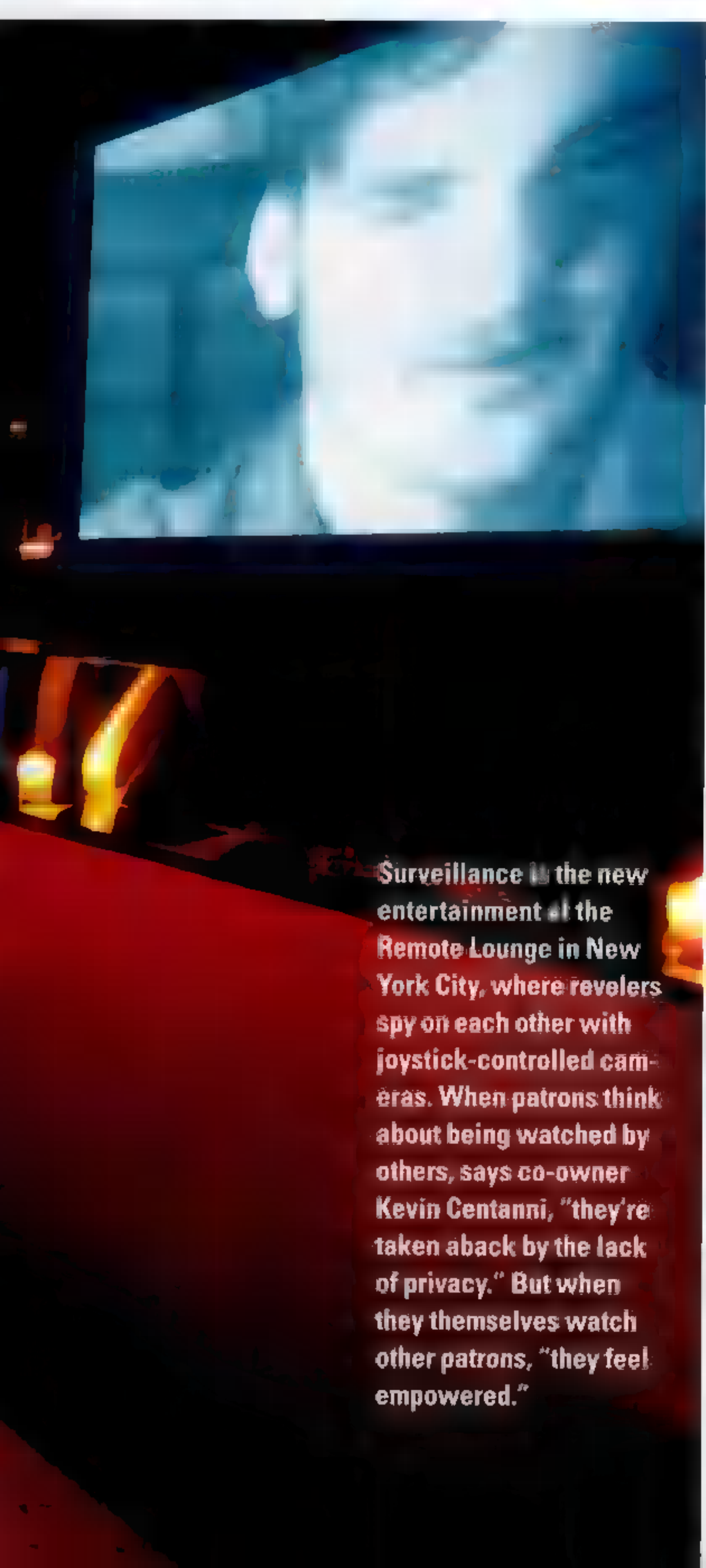
This is what scientists and technologists like Moskowitz have become obsessed with since the morning of September 11, 2001. Where is the next intended ground zero? And what can be done to protect it?

Police do, of course, have surveillance cameras trained on the 700,000 commuters passing through Grand Central each day, along with assorted other high- and low-tech detectors looking for conventional explosives, nukes, dirty bombs, chemical weapons, and bio-weapons. Hundreds of human detectives, in and out of uniform, also keep a close eye on things. But nothing in their assorted surveillance tool belt comes close, Moskowitz says, to the slightly moist olfactory surveillance machine developed in the Canidae family over four billion years of evolution. A single dog’s nose could someday save Grand Central Terminal from collapse.

Against that furry gold standard, the tinkers tinker late into the proverbial night, trying to speed up the process of discovery. In the post-9/11 landscape we need dog-nose equivalents for facial recognition and to detect money laundering, encrypted e-mail, bioweapons, and suitcase nukes—and we need them now.

Evolution, the supreme innovator, is too slow for these tasks. Suddenly everyone is acutely aware of our profound surveillance weaknesses. It appears that our intelligence agents cannot adequately detect or track terrorists living in the U.S.; that we cannot effectively screen ships or trucks for nuclear weapons; and that even with a sky full of spy satellites and pilotless drones, the search for the world’s most wanted man, Osama bin Laden, still turned up only cold trails two years after 9/11.

We are hurtling toward constant electronic scrutiny—of the enemy and of ourselves. Increasingly, ours is a world of ID checks, surveillance cameras, body scans, fingerprint databases, e-mail sifters, and cell phone interceptors designed to ensure that electronic trails don’t grow cold. Add to that more mundane domestic gadgets like nanny-cams, wireless heart monitors, swipe-in school and workplace IDs, and E-ZPass, a tag that attaches to your car windshield and electronically deducts

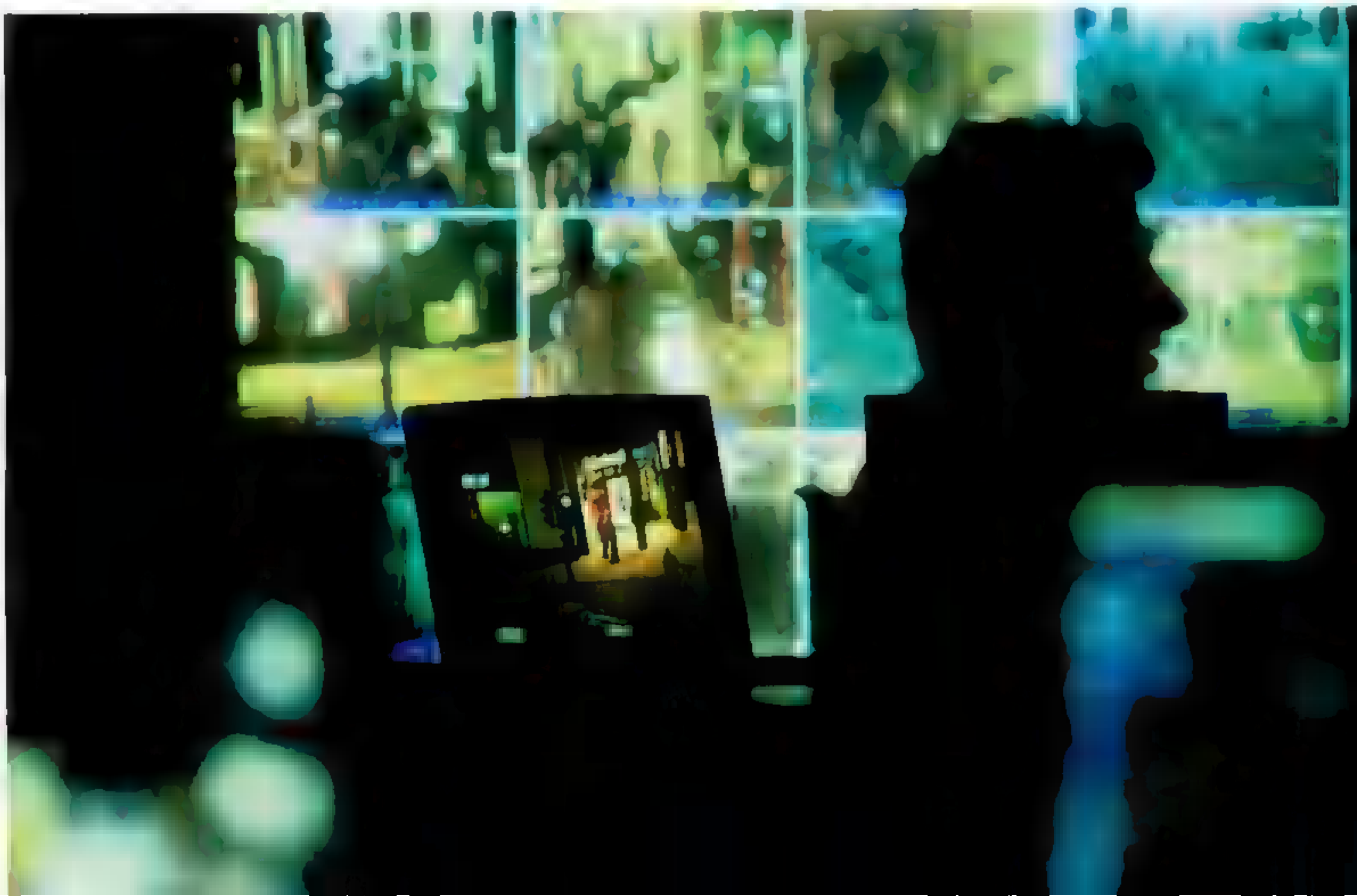


Surveillance is the new entertainment at the Remote Lounge in New York City, where revelers spy on each other with joystick-controlled cameras. When patrons think about being watched by others, says co-owner Kevin Centanni, “they’re taken aback by the lack of privacy.” But when they themselves watch other patrons, “they feel empowered.”



SECURITY BLANKET

When posters started appearing last year on London double-deckers reading "Secure Beneath the Watchful Eyes" (right), the Orwellian overtones were so strong that more than a few Londoners mistook the signs for satire. But the posters were real. The United Kingdom has become perhaps the world's most surveilled nation, with more than four million closed-circuit television cameras, including fancy rotating models with wipers to clear the rain (above). First installed in the 1960s, the cameras have exposed crimes from littering to mugging to tax evasion. Now they watch for possible terrorist activity. In Manchester (below), security officials can monitor streets and public areas in the city center.



highway tolls from your prepaid account, and you begin to get a whiff of an emerging electronic vigilance, an ever examined, ever watched landscape of total surveillance.

Late one autumn day at the aquatic center in Ancenis, France, something went quietly, horribly wrong. With its two well-kept pools and teaching facilities, the center serves as a modern swimming hole for an entire sector of historic Brittany, attracting 150,000 French villagers a year. An 18-year-old

deep end of the pool. With his arms crossed over his head and his feet twitching, he was unconscious and drowning. It would take him as little as four minutes to die.

Although the human lifeguards watching the pool were oblivious, 12 large machine eyes deep underwater were watching the whole thing and taking notice. Just nine months earlier the center had installed a state-of-the-art electronic surveillance system called Poseidon, a network of cameras that feeds a computer programmed to use a set of complex mathematical algorithms

CAMERAS ARE BECOMING SO OMNIPRESENT THAT ALL BRITONS SHOULD ASSUME THEIR BEHAVIOR OUTSIDE THE HOME IS MONITORED.



named Jean-François LeRoy was a regular, coming often in the early evenings to swim laps in the 25-meter pool.

Drownings are often difficult to spot; they are rarely the splashy, flailing events depicted on television. Most are near-silent episodes where the victim quickly sinks out of view. On this particular day maybe the lifeguards weren't paying as close attention as they should have been. Certainly they believed the trim, athletic LeRoy was not a high-risk swimmer.

But on this evening LeRoy was practicing apnea swimming—testing how far he could swim underwater on one breath—and at some point, without making any visible or audible disturbance on the water's surface, he blacked out. The guards failed to notice as he stopped swimming and descended to the bottom of the

to distinguish between normal and distressed swimming. Poseidon covers a pool's entire swimming area and can distinguish among blurry reflections, shadows, and actual swimmers. It can also tell when real swimmers are moving in a way they're not supposed to. When the computer detects a possible problem, it instantly activates a beeper to alert lifeguards and displays the exact incident location on a monitor. The rest is up to the humans above the water.

Sixteen seconds after Poseidon noticed the large, sinking lump that was Jean-François LeRoy, lifeguards had LeRoy out of the pool and were initiating CPR. He started breathing again. After one night in the local hospital, he was released with no permanent damage. Poseidon—and, more precisely, the handful of French mathematicians who devised it—had saved his life.

Machines like Poseidon will redefine how we live. Think of your life before the answering machine, the ATM, e-mail. Think of your grandparents' lives before the television and the airplane. Think of your great-grandparents' lives before the telephone. All told, the shift will be that substantial.

Machines will recognize our faces and our fingerprints. They will watch out for swimmers in distress, for radioactivity- and germ-laden terrorists, for red-light runners and highway speeders, for diabetics and heart patients. Imagine devices that monitor the breathing rhythms of infants in cribs, watch toddlers at day care, and track children as they go to and from school; that can keep an eye on our home

ELECTRONIC WATCHDOGS

How do you secure 6,000 miles of border? For many years in the United States, the answer has been: You don't. There's too much terrain and too little manpower to stop people intent on getting in. Now things like motion sensors, remote-controlled cameras, night-vision devices, and surveillance satellites are helping to change that equation. Here on the Arizona-Mexico border, agents using infrared cameras on elevated platforms can spot people two miles away in the dead of night.

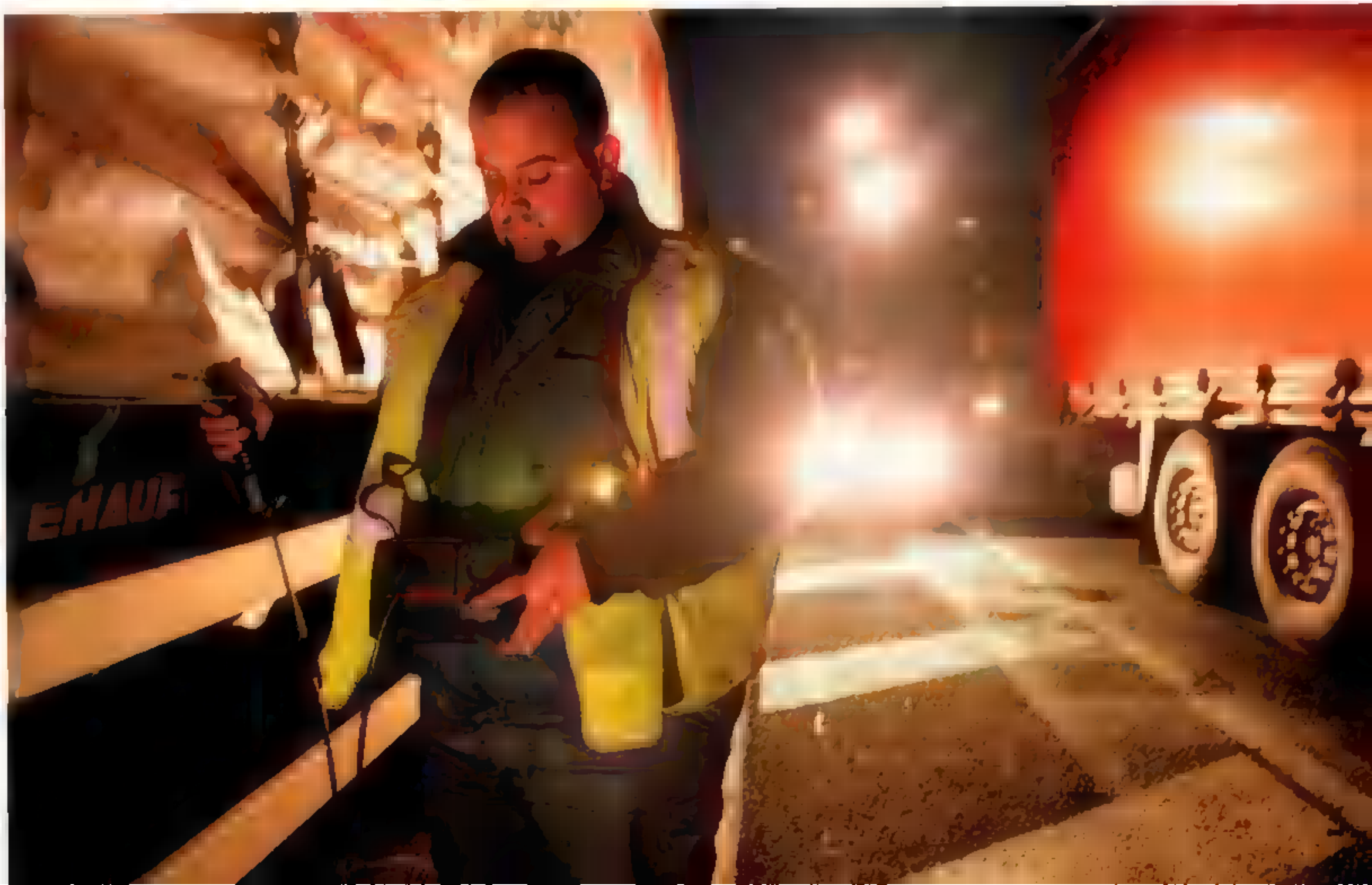






SNIFFING OUT STOWAWAYS

New solutions frequently beget new problems, and the Channel Tunnel connecting France and Great Britain was no exception. In 1994 the countries were finally linked by a half-hour train ride beneath the Strait of Dover, making it easy for passengers and freight to cross the border. With up to 5,000 trucks carried through the tunnel each day, it was also easier for undocumented aliens to sneak through. Enter passive millimeter wave imaging (PMMW), a technology that can see through solid surfaces by measuring reflections of natural background radiation. After a PMMW scanner checks moving trucks for bodily forms (above), a "sniffer" (below) measures carbon dioxide levels, elevated by human respiration. With this one-two punch, agents routinely catch stowaways (right).



supply of orange juice and let us know when the milk is sour. Machines might watch our calorie intake and burn-off, monitor air quality in our homes, and look out for mice and bugs.

Envision sensors as large as walls and as small as molecules in your bloodstream sending quiet signals to nearby computers, which will process and relay information to you, your doctor, your lawyer, your grocer, your building manager, your car mechanic, your local fire or police department. As time and technology march on, less and less will escape the attention of

considered perhaps the most vulnerable entry point for weapons of mass destruction.

On this ominous day authorities had a tip that an approaching vessel might be carrying such a weapon. They boarded a handful of ships identified as high risk. After a rigorous onboard inspection of *Palermo Senator*, someone detected radiation emanating from the ship. It was hot.

Officials immediately ordered the vessel to a safer distance of six miles offshore, where Coast Guard, FBI, and Department of Energy

AS TIME AND TECHNOLOGY MARCH ON, LESS AND LESS WILL ESCAPE THE ATTENTION OF SOPHISTICATED MACHINES. THEY'LL HAVE US COVERED.



sophisticated machines. They'll have us covered.

These digital eyes, ears, and noses, we hope, will also protect our cities from cataclysm. But as Paul Moskowitz and others like him make abundantly clear, we're not there yet.

Example: On September 10, 2002, as New York City braced itself for the first anniversary of the 9/11 attacks, and as the world wondered what al Qaeda had in mind to mark the occasion, a 708-foot container ship named *Palermo Senator* slowly motored toward New York from the Mediterranean to unload hundreds of 40-foot containers.

Every day, 19,000 such containers arrive in the U.S. A nuclear device hidden in just one of them could kill millions of people and cripple New York or any other port city. By virtue of the sheer volume of shipments, seaports are

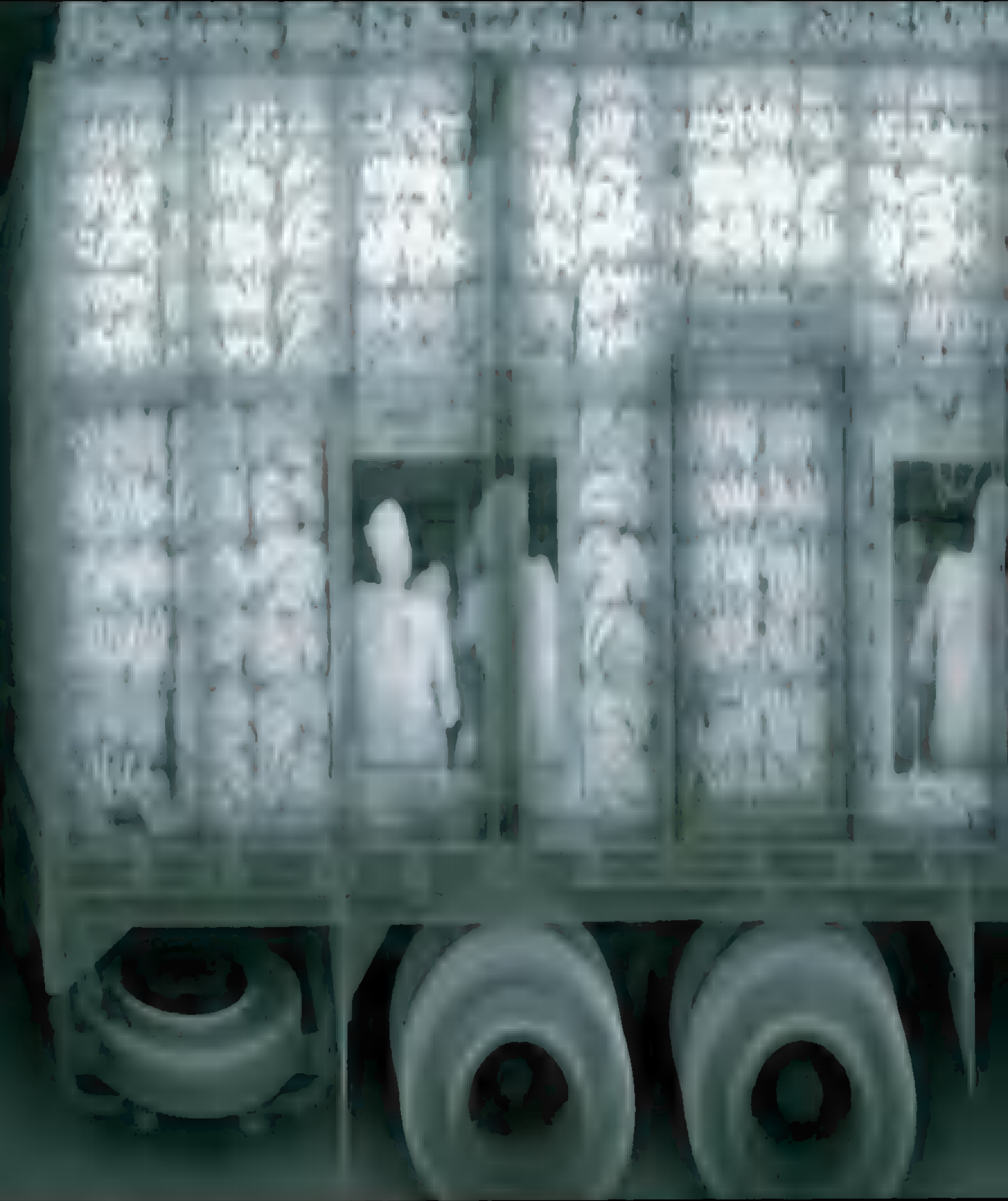
specialists along with a team of Navy SEALs spent two days combing the boat for the radiation source. They finally pinpointed a large shipment of ceramic tiles. The radiation was natural and safe. False alarm.

But the incident was profoundly worrisome as a demonstration of how costly and cumbersome it is to detect a nuclear needle in the shipyard haystack. And a false alarm is still an alarm; alarms command resources. Since 9/11, similar false alarm dramas play themselves out on a smaller scale many times every day: The air traveler whose name happens to be the same as one on a terrorist watch list; the x-ray machine or metal detector that seems obsessed with a car key. Many New York police officers now sport low-cost pocket-pager-like radiation detectors sensitive enough to pick up small amounts of radiation but crude enough to be set off by harmless medical equipment—or even recently irradiated cancer patients.

“False positives can create an unmanageable backlog and can also lead to what we call organizational fatigue,” says Paul Moskowitz. “People get worn out and become far less alert.” The singular goal of any new surveillance system, then, is to effectively ferret out serious threats while keeping false positives down to a negligible level.

During my visit to Brookhaven Lab, Moskowitz ushered in a series of star innovators to demonstrate advanced prototypes that would home in on the real dangers. In the realm of nuclear detection, the key is instruments that

NO PLACE



TO HIDE

CURIOUS CARGO

Superman's no longer the only one with x-ray vision. New backscatter x-ray machines look through thin surfaces like truck walls to produce detailed images of what lies behind them—in this case, illegal immigrants hidden among a cargo of bananas on the Guatemala-Mexico border. Where manual inspections might take hours, x-raying takes minutes and can detect not only people but also drugs, weapons, and explosives. (The PMMW scanner on page 17 works on moving objects but produces fuzzier images.)

detect specific particles—like certain gamma rays or neutrons—present in bomb-grade material. At the same time, the detectors must be durable enough to withstand constant use and considerable abuse.

One creative challenge is to integrate extraordinary new surveillance tools into ordinary infrastructure. Detectors might be effectively attached to cranes or built into highway off-ramps. “We even thought of attaching large gamma-ray detectors to the underside of the Verrazano-Narrows Bridge to scrutinize ships passing beneath it,” Brookhaven’s Peter Vanier explains. Or detectors might be attached to helicopters or to pilot boats in order to examine ships before they enter the harbor.

It may not be the kind that sees gamma rays, but a surveillance tool may one day reside in every pocket. In Europe and Asia a number of countries are introducing a citizen smart card that would serve as an official national ID. It could hold personal medical history, social security information, and serve as a passport, train pass, toll card, credit and debit card, long-distance phone card, and library card. A one-card wallet.

That card could tap into systems that talk to each other, merging the worlds of consumer convenience and citizen surveillance. Your e-mail will know your cell phone will know

connect all the dots in a complex investigation.

In totalitarian regimes that don’t recognize citizens’ rights to privacy to begin with, this sort of all-seeing, all-knowing surveillance obviously threatens to become the terrifying realization of George Orwell’s Big Brother. But what Orwell did not prophesy in his novel *1984* was just how pervasive surveillance would be in free societies, introduced not by despots but in the name of liberty, safety, and security.

Take Great Britain, Orwell’s native land. In the 1970s and ’80s, municipalities tentatively began installing closed-circuit television cameras (CCTVs) on streets and in parks, transit stations, stadiums, and shopping areas. Then, in the 1990s, attacks by the Irish Republican Army and a threatening rise in urban crime prompted a massive proliferation of CCTVs. In the ensuing decade so many cameras were installed that the government lost count.

With more than four million CCTV cameras nationwide, the deployment certainly amounts to more than anywhere else in the world, somewhere around one for every 15 people. The average visitor to London, estimates British sociologist Clive Norris, is now captured on video 300 times in a single day. In an exhaustive study of surveillance trends in the United Kingdom, Norris and his colleague Michael McCahill conclude that cameras are becoming so omnipresent that all Britons

THAT CARD COULD TAP INTO SYSTEMS THAT TALK TO EACH OTHER, MERGING THE WORLDS OF CONSUMER CONVENIENCE AND CITIZEN SURVEILLANCE.

your shopping list will know your online pharmacy will know your UPS account, all of it potentially available to marketers—or hackers—and just one search warrant away from government inspection. The U.S. Treasury Department’s Financial Crimes Enforcement Network (FinCEN) already brings together financial, law enforcement, and commercial databases and a considerable array of government agencies in a vast attempt to ferret out money laundering and other financial crimes. A new commercial software tool called Coplink uses artificial intelligence algorithms to search the Internet and confidential crime databases, helping law enforcement agencies to

should assume their behavior outside the home is monitored. Not being publicly surveilled is fast becoming the rare exception.

The actual effectiveness of the cameras is far from clear. The most rigorous studies show “a sustained and dramatic reductive effect in some areas,” according to McCahill and Norris, and “a negligible impact in others.” Nevertheless, the public seems to approve of the cameras.

Buoyed by that support, the British government is now moving ahead to the next phase: an ambitious vehicle surveillance system designed “to reduce serious and volume crime by denying

(Continued on page 22)



BODY CHECKS

Fingerprint identification has been used to solve crimes since the days of Sherlock Holmes, but the practice took a giant step forward in 1999 when the FBI began using a networked system that lets authorities search 46 million sets of prints within minutes. Analysts previously had to sort through two football fields' worth of file cabinets to compare prints. In Arizona the fingerprints of illegal border crossers are checked against a Department of Homeland Security database (above) and against the FBI database. Future tracking may be done with irises: Their more complex patterns leave less room for error. Already, at Amsterdam's Schiphol airport (below), frequent fliers can save time with a program that stores their iris patterns on a card they can swipe.



ABOUT FACE

SPY VERSUS (ELECTRONIC) SPY Facial-recognition systems are popping up in airports, government buildings, stadiums, even streets—anywhere authorities fear potential misdeeds by known terrorists and fugitives. To be effective, commercial systems must see through disguises and past the effects

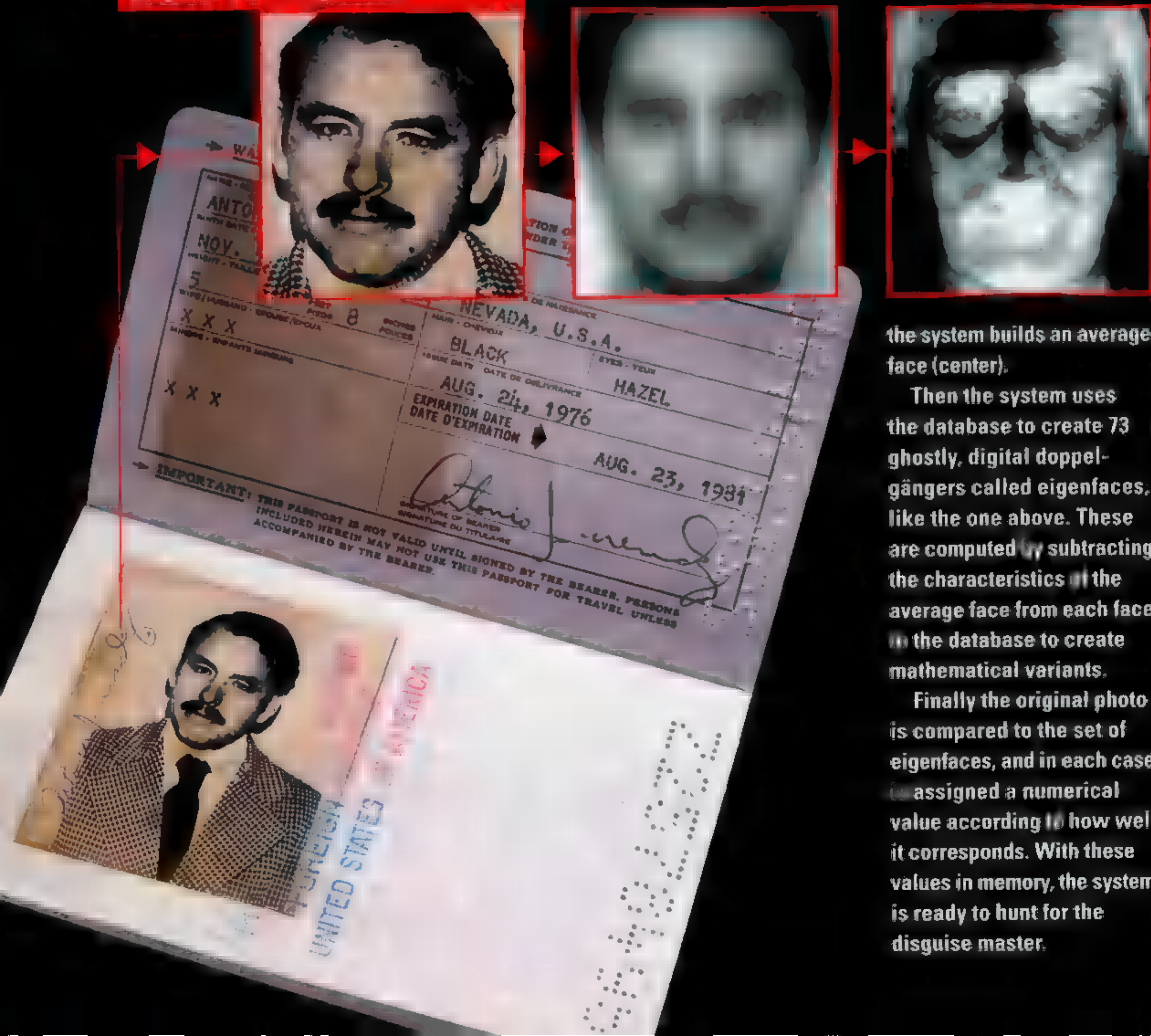
of aging to single out a suspect. Are they really reliable? NATIONAL GEOGRAPHIC asked Tony Mendez, a former CIA operative and disguise expert, to try to fool a basic face-recognition program. Researchers at the University of Maryland performed a simple experiment to demonstrate the difficulty of automatic face recognition with faces altered by aging, disguise, lighting, or head rotation. So which prevailed—computer or spy? Hard to say, really. But with the technology still in its infancy, don't take human eyes off the case just yet.

THE PROCESS BEGINS

with a single photograph for the system to analyze. Recent and well lit is best. But to make this simulation more realistic, Mendez's grainy, 27-year-old passport photo is used (below left).

Next the photo is fed into a database of many faces—in this case 73—from which

HOW IT WORKS



THEY'RE ALL THE SAME MAN. CAN BIOMETRICS PROVE IT?



TEST 1



100%



39.68%



19.67%



12.28%



9.62%



8.08%

TEST 2



100%



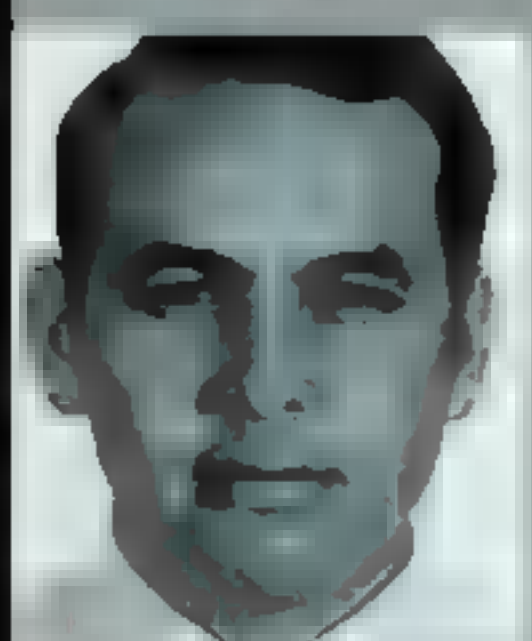
83.58%



62.80%



61.16%



44.57%



19.67%



OLD PHOTO

Armed with the passport photo (above) and the eigenfaces, the system sets out to try and recognize Mendez in a variety of pictures. The percentage beneath each photo roughly indicates the degree of correlation the system finds in each comparison. When the system analyzes an exact match (top), there's no problem: 100 percent. But it's downhill from there. The next two photos, one from several years earlier and one current, register a low degree of correlation. When Mendez dons his disguises, there's a good chance he can snooker the system. Why? It's possible that the age of the passport photograph initially hurt the system's performance, the Maryland researchers say. With the effects of time on Mendez's appearance added to the disguises, the system is unlikely to recognize him.

NEW PHOTO

Down but not out, the face-recognition program prepares for another round, this time using a current image ■ Mendez (above) for comparison. The system does better, assigning a disguised Mendez an 84 percent correlation despite glasses, a goatee, and a different head position. The system does a poorer job seeing through two other disguises, although, with correlation rates over 60 percent, it still surpasses its performance in the first test by a wide margin. Mendez's two older photos signify little ■ the system and show the lowest correlations. So the system performs better with a more recent original photo, which raises a big question: Can today's face-recognition technology monitor the movements of people for whom government or law enforcement agencies don't have a good, recent portrait on file? Perhaps not.

**WHAT GEORGE ORWELL
DID NOT PROPHECY
IN HIS NOVEL *1984* WAS
JUST HOW PERVASIVE
SURVEILLANCE WOULD
BE IN FREE SOCIETIES.**

CLANDESTINE EAR

This much is known: A 560-acre complex of satellite dishes in Menwith Hill, England, run by the United States' National Security Agency may be the largest surveillance station in the world. What's unclear is the station's connection with the program known as Echelon, which can intercept and analyze telephone and computer transmissions from around the globe. NSA is quiet on the matter, but outside experts say the agency's supercomputers scan millions of ordinary phone calls and e-mails an hour.





(Continued from page 16) criminals the use of the roads.” Relying on a synchronization between optical character-recognition software and criminal databases, fixed and mobile cameras available to every police force in England and Wales will scan license plates and flag suspicious ones. Public surveillance in Britain, suggests urbanist Stephen Graham, has emerged as a fifth utility, joining water, gas, electricity, and telephones as an essential public service.

In the 18th century, jurist Jeremy Bentham imagined an ominous structure called a panopticon (from Greek meaning “all-seeing”). The

structure had a central guard tower from which every inhabitant could be watched at any time without knowing it. Britain’s modern twist is the voluntary panopticon—where citizens seem only too pleased to be watched over. What was originally proposed as perhaps the ideal weapon of coercion is now being sought as a shield to protect free society from itself.

Public video systems are now proliferating in Melbourne, Sydney, Vienna, Berlin, Brussels, Dublin, Baltimore, Palm Springs, and scores of other cities small and large. In Jerusalem, Israeli officials have packed the tangled alleys of the

VIRTUAL STRIP SEARCH

If you don't like taking off your shoes at the airport security check, hold on tight: The machine shown at right makes you naked. Its backscatter x-rays create front and back views of what lies beneath a person's clothing—wallets, weapons, love handles, and all. Able to detect ceramic knives and plastic explosives, it's far superior to metal detectors, but privacy concerns have sent the creators back to the drawing board in search of a way to blur bodily details.



Old City with surveillance cameras. In Paris ubiquitous road cameras help regulate traffic, and some 2,000 cameras on city buses detect and deter crime. Police in Monaco have so saturated their streets with cameras as to make them confident that virtually all future street crime will be recorded.

So only a handful of years after the end of the Cold War, which was largely a battle between intrusive regimes and open democratic ones, the democratic winners are now adopting their own brand of public intrusiveness for the sake of comfort and security.

A less democratic watchfulness is fast emerging in the corporate universe: Three-quarters of major U.S. firms now acknowledge that they monitor employees' e-mail, Web browsing, phone calls, or computer files. And while few workers would claim to be openly pleased about the proliferation of workplace surveillance, the vast majority are clearly putting up with it.

The lack of protest or genuine public debate is unnerving to privacy advocates. "The cameras are not just coming—they're here now," warns New York civil rights lawyer Norman Siegel. "There has been an explosion of video surveillance in public spaces without any real public debate about the pros and cons. That's remarkable. You'd think there would be a referendum somewhere."

Siegel, who says he is not an outright opponent of public surveillance, offers a short list of policy suggestions for surveillance:

All video surveillance zones and cameras should be listed on a public register that can be easily accessed at a library or on the Internet.

Every surveillance zone should include visible warning signs.

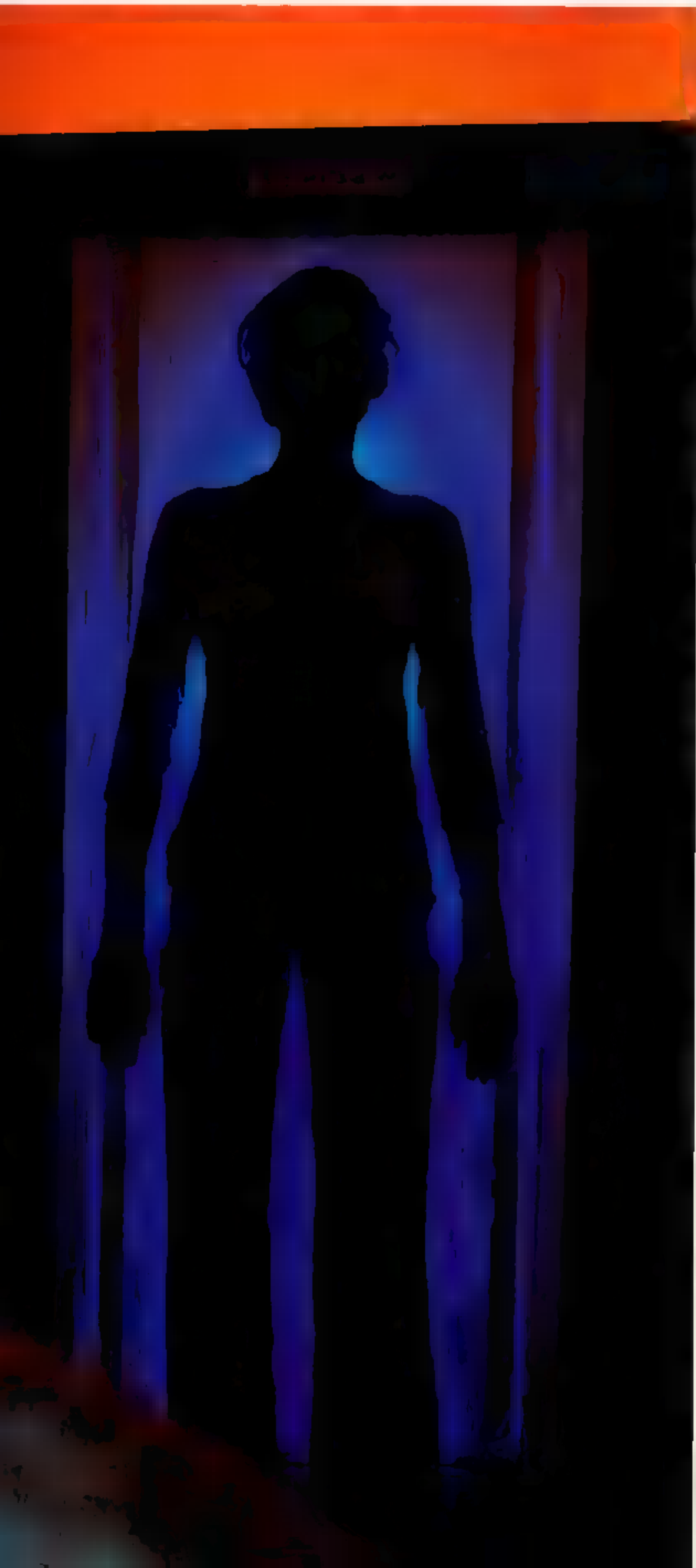
Access to surveillance data should be strictly limited, and material that records no criminal acts should be archived only temporarily.

A designated surveillance advocate in each community should actively assure that the regulations are enforced.

In Jeremy Bentham's panopticon, people experience the overwhelming power of surveillance because they're never sure when they're being watched and when they aren't. The new democratic version carries the same principle: It's as much about deterring crimes as it is about investigating them. The notion of deterrence is embraced so vigorously in Britain that "CCTV in operation" signs appear even in places where cameras are not installed.

The U.S. is decidedly moving in the direction of Britain. A showcase for some of what could be in store presented itself at the 2002 Winter Olympics in Salt Lake City, Utah. On the heels of 9/11, the games represented a potential terrorist target.

There in Salt Lake City, quietly nestled among the tens of thousands of athletes, dignitaries, and tourists, was a team of agents from the FBI, FAA, U.S. Secret (Continued on page 28)



DATA TRAIL




HOME TV COMPUTER NETWORKED APPLIANCES PERSONAL FACIAL FEATURES FINGERPRINTS

A DAY IN YOUR LIFE

THEY'RE NOT JUST WATCHING BAD GUYS


Sometimes it's obvious when you're being watched, and sometimes it's impossible to tell. Take it as a given, though, that you're monitored more than you've ever been before. Whether it's video cameras on city streets or marketers analyzing purchase patterns, our increasingly wired (and wireless) world is stripping us of the protective cloaks of anonymity and privacy, even as it arguably increases our security and convenience. The decades ahead will surely make the monitoring of our daily activities seem routine. But in the meantime, we'd better get used to the increased exposure.

IN YOUR HOME




Your home may be your castle, but its moat is not very wide. Anyone with enough know-how and motivation can listen to conversations you have on your cordless phone and read your online activity like a wide-open book. The latter is certainly the greater intrusion, but that Internet connection is like any other window: It gives you an eye on the rest of the world even as it makes you vulnerable to being seen by others. Want to stay invisible and maximize your privacy? Make sure your home computers are protected from outside intrusion. And certainly don't get in line for one of those refrigerators still in development that will automatically inventory and reorder your groceries.

WHEREVER YOU GO



People expect less privacy on the phone these days simply because they have so many more of their conversations in public, within earshot of strangers. You might not realize, however, that eavesdroppers can illegally pick up wireless laptop and PDA communications. You also might not realize that computerized automobile systems with GPS and cellular communication can do more than call for help after a breakdown or call up a map when the driver is lost. That information—everywhere a vehicle goes, and when and how fast—is potentially open to insurers, marketers, and law enforcement.

AS YOU WORK AND PLAY



So who's watching and how much should you worry? Sure, government officials are looking for criminals and enemies all the state. But for most people, the heaviest-handed surveillance comes from employers, who have a legal right and the technical ability to read employees' e-mails, monitor Internet activity, and even eavesdrop on telephone calls. Marketers aren't far behind, as computer networks allow businesses to buy, sell, share, and analyze personal data at unprecedented levels. Watch this space: Billboards of the future might read your identity as you approach, search a database for your preferences, and display an ad chosen just for you. And you thought nobody cared. ***

LEGAL TERRA INCOGNITA



THE THERMAL IMAGE BY RIDGID SYSTEMS

The framers of the U.S. Constitution never anticipated thermal imaging devices, so the Supreme Court was on new ground when it came time to decide whether Danny Lee Kyllo's rights had been violated when police aimed one at his house and found hot spots in his roof from marijuana grow lights (re-created above, minus the plants). The court ruled the act an illegal search, even though no one had entered the house. The Supreme Court may yet hear the case of Sultaana Freeman, a Muslim in Florida who was told she could no longer wear her veil for her driver's license photo. Citing "new threats to public safety," a Florida judge ruled that the state has a right to see her face.



(Continued from page 23) Service, State Department, Utah National Guard, and other federal, state, and local agencies. Together they ran an unprecedented security operation that transformed the area into a veritable fishbowl.

At the heart of the operation was the Sensormatic Intellex DVI6000, a digital video system that processes input from multiple cameras, archives everything for future review, screens for preprogrammed problem signs such as suspicious movement or light changes, and distributes customized portions of the video stream to any authorized computers on the system. At any time during the 17-day games, video images—from inside and outside sports venues, from all around Salt Lake City's Olympic Square, and from key angles surrounding important city infrastructure—could be watched simultaneously at the Olympic Coordination Center, at FBI headquarters in Washington, and, if need be, in the White House Situation Room.

On the morning of opening day, NBC's Matt Lauer interviewed Secret Service Director Brian Stafford and asked how visible would security be in the Olympic stadium that night. Stafford replied: "You'll see some countersnipers, you may see some counterassault teams. There's a lot more you won't see."

With deterrence such an important objective of the surveillance, Stafford and other security officials in Salt Lake City were only too happy to emphasize that most of the watching was invisible. Attorney General John Ashcroft, after his pre-games tour of Olympic security, declared: "This is new ground. What is being done here will set a new standard."

Did Salt Lake City set a new social standard too? Extraordinary concern after 9/11 called for extraordinary measures at the 2002 games, and there was no outcry from the public at large—or from privacy advocates. But will the welcoming attitude toward heightened surveillance at the Olympics transfer to attitudes about more ordinary, public places?

WEBSITE EXCLUSIVE

- How much privacy should we sacrifice for security? Join the discussion in our forum.
- See how satellite surveillance can home in on strategic zones anywhere on Earth.
- Find out how surveillance technologies on the U.S.-Mexico border have caused unintended consequences. nationalgeographic.com/ngm/0311.

Signs point to yes. In the coastal resort town of Virginia Beach, the police have installed a facial-recognition system that looks for people connected to outstanding arrest warrants. In Washington, D.C., the National Park Service is installing surveillance cameras around federal monuments. And in the same city, Woodrow

In the dressing room of Manhattan's new Prada store, a shopper gets a private view via closed-circuit TV, or she can consult another monitor that recommends accessories after reading a garment's silicon chip. It's high-tech shopping with nary a seam visible, part of a new reality that will not fail to make its presence felt.

HERE'S LOOKING AT ME



Wilson High School has replaced morning roll call with an electronic ID-recognition system that not only keeps tabs on everything from class attendance to outstanding library fees, but also reminds people that the surveillance is personal by playing a special jingle for every birthday boy and girl. With every casual swipe, tomorrow's democratic citizens are being conditioned to live in tomorrow's voluntary panopticon.

Meanwhile back in New York, a trendy new Bowery bar located roughly between ground zero and Grand Central Terminal has inaugurated a kind of surveillance chic. The Remote Lounge is packed with video cameras and monitors, and

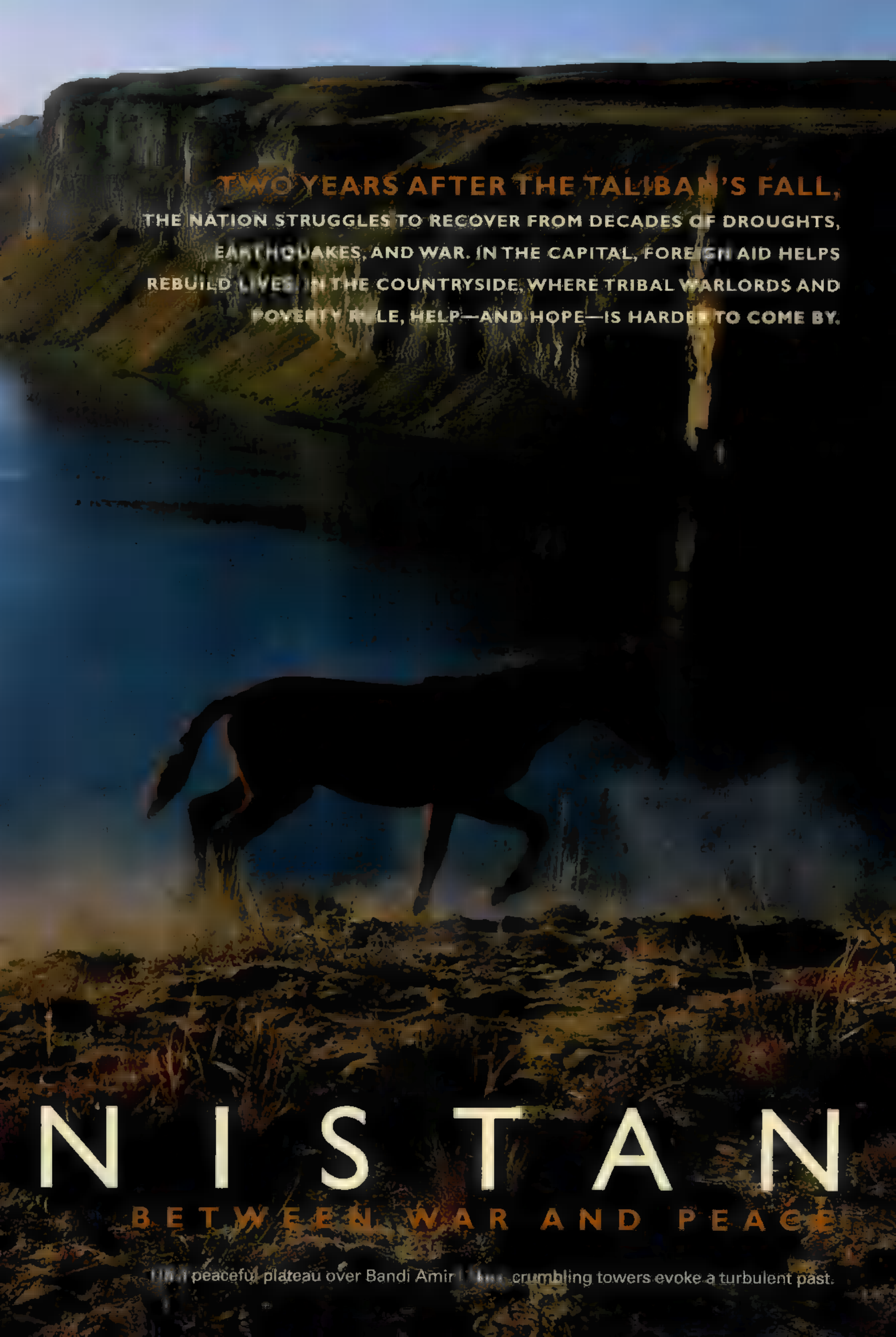
the entrance features a brightly lit disclaimer: "Upon entering these premises your name, image, voice, and likeness may be broadcast live over the Internet. . . . You hereby agree that you have no expectation of privacy for any acts or statements made on these premises."

It is half legal waiver, half social dare. Inside, patrons toggle constantly between camera angles, spying and being spied on by everyone else. In a city and a world that suddenly feels much less safe, being watched has its discomforts, its reassurances, even its thrills. Clearly for the moment—for better or worse—surveillance surrounds us and shapes us. □





A F G H A

A dark, atmospheric landscape with a horse in the foreground and a plateau in the background. The scene is dimly lit, with a blueish-grey sky and a dark, rocky ground. A horse is silhouetted against the light, walking from left to right. In the background, a large, flat-topped plateau or cliff face rises, with some structures or ruins visible on its surface. The overall mood is somber and reflective.

TWO YEARS AFTER THE TALIBAN'S FALL,
THE NATION STRUGGLES TO RECOVER FROM DECADES OF DROUGHTS,
EARTHQUAKES, AND WAR. IN THE CAPITAL, FOREIGN AID HELPS
REBUILD LIVES. IN THE COUNTRYSIDE, WHERE TRIBAL WARLORDS AND
POVERTY RULE, HELP—AND HOPE—IS HARDER TO COME BY.

AFGHANISTAN

BETWEEN WAR AND PEACE

From a peaceful plateau over Bandi Amir, the crumbling towers evoke a turbulent past.

BLOOD OF FREEDOM Protest and faith meld as minority Shiite Muslims flagellate themselves during the Ashura holiday, drenching a Kabul shrine in blood. Suppressed by the Sunni Taliban rulers, this politically charged rite has reemerged.





BY EDWARD GIRARDET PHOTOGRAPHS BY STEVE McCURRY

A persistent wet snow blanketed the marketplace as shouting villagers, their plastic shoes slipping in the mud, unloaded food, tools, and other basics from the four-by-four pickups that ply the narrow dirt road linking the Afghanistan town of Jalalabad with the remote northeastern province of Nuristan. The falling snow was so thick you could no longer see the peaks of the Hindu Kush, their cedar-forested slopes looming precipitously over the flat-roofed wood-and-stone dwellings below. It was early last November in Paprok, a small



trading town straddling the thunderous headwaters of the Nuristan River. For a week Paprok and much of the rest of Afghanistan had been drenched by rain and, in the higher regions, snow—a welcome respite from a four-year drought.

“This is exactly what the country needs,” declared Mohammed Ali, a community development manager with the British agency Afghan-aid. “But it may take a lot more, maybe two seasons, for the drought to break.”

Since the drought began many Afghan farmers had missed two, even three, harvests, unable to

plant their wheat on the nearly ten million acres of rain-fed lands that constitute more than half Afghanistan’s cultivable area. Other farmers had to sell their livestock as a desperate last resort. Meanwhile, Kabul’s reservoirs had shrunk to little more than ankle-deep puddles barely the size of football fields. In addition to drought, earthquakes during the past several years have wrecked entire villages in the north, killing and wounding thousands.

For Afghans like Mohammed Ali, who are trying to put their country back on its feet, it is impossible to separate the impact of natural disasters from the impact of war. Two years ago this month, a U.S.-led coalition overthrew the Taliban, the fundamentalist Islamic movement that had ruled the country since 1996. But that was only the most recent episode in a quarter century of turmoil. Afghanistan’s current tragedy can be traced to a popular uprising in the summer of 1978 against the communist People’s Democratic Party of Afghanistan, which had grabbed power in a coup d’état several months earlier. As the fighting spread, the Soviet Union felt obliged to support the besieged communist regime and invaded the country on December 27, 1979. By the mid-1980s more than five million men, women, and children—one-third of Afghanistan’s population—fled to Pakistan, Iran, and other countries in one of the globe’s largest exoduses since the end of World War II. When the Soviet occupation ended in 1989, an estimated 1.5 million Afghans had died. In the ensuing struggle for power perhaps another 50,000 people were killed in Kabul, largely as a result of indiscriminate shelling by the forces of Gulbuddin Hekmatyar, an Islamic extremist supported by the U.S. during the 1980s. A further 3,000 to 4,000 Afghan civilians were reportedly killed when the U.S. and its allies drove the Taliban from power.

It is not surprising, given this tumultuous backdrop, that many Afghans believe that now is their one chance—albeit a fragile one—for peace and stability. As Mohammed Awrang, a thin-faced former *mujahid* who currently

SPOILS OF VICTORY Returning war refugees hoping to find work, like these men back from two decades in Iran, often seek shelter in Kabul’s teetering ruins. Despite pledges of foreign aid, such scenes remain commonplace in the devastated capital.



ETHNIC GROUPS



Warlords—powerful tribal leaders who hold sway over various ethnic groups—control large swaths of rural Afghanistan. Major cities tend to be melting pots, where inter-marriage and cultural mixing weaken the factionalism that threatens the nation's stability.

dedicates himself to development projects in the northeast province of Badakhshan, said: "It is up to us—ordinary Afghans—to ensure the peace, because who else will?"

For now Afghans must rely on thousands of foreign soldiers and aid workers trying to keep the peace and carry out the international community's recovery plan for their country—a gargantuan task the UN and World Bank estimate will cost between 11 and 19 billion dollars over the next decade. The plan aims to help Afghans rehabilitate agriculture, create jobs for returning refugees, rebuild roads, and improve health

CHILD OF HISTORY The European features of a girl in a Kabul market hint at the migrants and conquerors—Persian, Greek, Arab, Mongol, British, Russian—who collided in the land historian Arnold Toynbee dubbed "roundabout" of the ancient world.

care and education. Already more than three million children, nearly one-third of them girls, have gone back to school. Investment in such projects as the laying of a natural gas pipeline from Turkmenistan across Afghanistan to the Indian subcontinent is also expected to contribute to the recovery. But progress has been slowed by funding delays and Afghanistan's internal volatility.

The task is made all the more difficult because Afghanistan is a nation in name alone. In reality there is the Afghanistan of Kabul, seat of President Hamid Karzai's internationally backed central government, and then there is the Afghanistan of everywhere else. Karzai's influence barely extends beyond the capital's suburbs. In the ravaged countryside where most of the estimated 20 million to 25 million Afghans live, self-appointed warlords rule. A recent human rights report found that gunmen are



FREE MARKET Buzzing with buyers and sellers, Kabul's Mandawi bazaar signals a gradual return of jobs, buying power, and normal life. Spared major war damage, the city's main market lures shoppers with a growing range of domestic and imported goods.







FOREIGN EXCHANGE A welcome sight to many war-weary Afghans, a Dutch soldier patrols near Kabul. Such peacekeepers in the International Security Assistance Force face danger, with several killed in sporadic attacks or by mines this year. Artifacts of an earlier foreign military presence—grim, Soviet-style apartment blocks (right)—ironically have attained high-rent status in a city where intact modern housing is rare.

terrorizing the countryside—robbing, detaining, and raping Afghan citizens without penalty—and creating a climate of fear.

The rift dividing Kabul from the rest of Afghanistan represents one of the most pressing challenges Karzai faces as he struggles to forge a cohesive society: How to develop an administration capable of working with highly diverse peoples and factions while asserting its authority and maintaining peace.

How diverse? Afghanistan is made up of half a dozen major ethnic groups. Karzai's government and security forces are largely dominated by the northern ethnic Tajiks, including the so-called Panjshairi mafia. The winner-takes-all attitude of many northerners has led to alienation among the more numerous Pashtuns, who have traditionally ruled the country. So far Karzai's efforts to broaden his power beyond Kabul have made little headway, especially in the Pashtun-dominated southern provinces where the Taliban had its strongest backing. (Karzai himself is a Pashtun from the southern city of Kandahar but is seen by many Pashtuns as on the side of the Americans and the northerners.)

The economy is a worry too. Without the pool of money created by aid, peacekeeping, and illegal trafficking in opium and other commodities, reconstruction would grind to a halt. The influx during the past year of offices, hotels, and restaurants—mainly in Kabul—stems largely from spending by the foreign community. Economists stress the need for more viable trade as soon as possible, both to provide Afghans with a proper livelihood and to provide the central government with a legitimate source of revenue from taxes. Otherwise, they warn, Afghanistan could collapse once more into turmoil.

The Karzai government hopes the new Afghan constitution will help stabilize and unify the country. But it is by no means clear whether the constitution will succeed in protecting the rights of ordinary Afghans, especially women. Liberals fear that conservative-minded Islamist Afghans will succeed in imposing restrictions not unlike those of the Taliban. Moreover, there is always the threat from outsiders opposed to a democratic Afghanistan, such as Pakistani fundamentalists, who have been infiltrating rural areas, inciting violence.



In late March I was forced to cancel a trip to Kandahar when I learned that Islamic radicals were preparing to attack expatriates in the region. Several days later armed men hijacked a humanitarian convoy near the city, executing the only foreigner in the group, a Salvadoran water engineer with the international Red Cross. The militants allegedly included representatives of the Taliban.

The role of NGOs in rebuilding Afghanistan is crucial: As Mohammed Ali, a robust man with a ruddy outdoor look, pointed out, “So much has been destroyed by the fighting that few real support structures are still in place.” But most of the hundreds of NGOs set up projects in and around Kabul, where it’s easier to operate, ignoring rural areas where conditions are most dire, such as the central highlands and the north.

“THE ONLY ONES THE AFGHANS REALLY TRUST ARE THE [INTERNATIONAL] PEACEKEEPERS.”

Yet despite the resurgence of violence, much of Afghanistan is safer today than when I trekked its mountains and valleys as a reporter during the Soviet war. In snowy Paprok, where my latest travels began, all was quiet. Since my first visit in 1981 the town has been improved with a new road and, astoundingly, electricity. Small hydroelectric generators have been installed by Afghanaid, one of the three nongovernmental organizations, or NGOs, in the region, as well as by villagers themselves.

Exceptions include Afghanaid and a handful of other experienced aid groups, notably Médecins Sans Frontières (Doctors Without Borders), Save the Children, and the Swedish Committee for Afghanistan. Afghanaid first began providing clandestine humanitarian relief to villagers struggling to survive Red Army aerial and ground assaults during the Soviet war. It now relies on skilled Afghans who know the land and people in communities far removed from the capital. Ali himself often spends months away from his family,





GABING HOLE Harvest in Bamian took place for 1,500 years under the gaze of mighty Buddhas hewn into a cliff. The Taliban, in one of their most widely condemned acts, destroyed the statues in 2001, calling them sacrilegious. Many Bamian Muslims mourned the loss. As one said, "The Buddhas were part of our culture, our history."



NO-MAN'S-LAND One of the country's countless widows relies on the kindness of strangers for survival. The Taliban's iron grip on women drove Reza Gul (right, in background) to despair as she saw her children go hungry, including Fatona, in foreground, talking to her father. "Many times I wished God would kill me," Reza, 35, says. Today she is again able to work outside the home to support her children and disabled husband.

working on projects to improve basic health care or provide women's groups with small loans to start their own businesses, such as handicrafts.

For the NGOs that do operate outside Kabul, the agenda is daunting. The northern province of Badakhshan suffers from one of the world's highest rates of maternal death during childbirth—6,500 out of 100,000. A health center run by the Swedish Committee for Afghanistan in Keshem in western Badakhshan is the only facility for a population of 70,000. Zudaidah, the clinic's head nurse, said: "If you live in the mountains, it can take days to get here. Sometimes people don't have money for transport, or women with birth complications are brought in far too late. So there's nothing we can do."

How does one rebuild a country where no one questions when a woman dies in childbirth, and a fourth of the children never reach the age of five?" asked Loretta Hieber, a senior communications officer with the World Health Organization. While I encountered few starving children, I saw many

with the gaunt look and limpid skin that are the signs of inadequate nourishment. In fact about half of Afghanistan's children suffer from malnutrition, making them more susceptible to dying from diseases such as measles.

Because most Afghan health workers lack proper training—and clinics, where they exist, are often bare-bones affairs—barely a third of Afghan children are immunized against childhood diseases. Late last year in Badakhshan a local leader walked for more than a day to the nearest town to report an outbreak of whooping cough that was killing scores of children. A medical team was finally dispatched from Kabul by helicopter to treat 40,000 children.

In June the World Bank gave Karzai's government 60 million dollars to extend health services to the provinces. Even so, Hieber said, "It will take years to extend even the most basic services to the rural areas." In a country where nearly two in three people have no access to health care, about half the hospital beds are in Kabul. The capital has one doctor for every thousand people; in Bamian province there's one for every hundred thousand. And it's believed that in the northwest



province of Ghowr, there isn't a single doctor for any of the estimated 300,000 people.

Support for refugees returning to Afghanistan is also heavily concentrated around Kabul and is dependent on foreign largesse. On the eastern fringe of the city is a tented refugee center run by the United Nations High Commissioner for Refugees (UNHCR), which processes Afghan returnees from Pakistan, among

acronym, UXO)—the lingering and most sinister curse of Afghanistan's wars. Dozens of Afghans are killed or maimed every month. Whether traveling the rutted roads in the northeast province of Takhar or through partly abandoned villages in Bamian, I regularly saw the walls of houses daubed with red paint or fields lined with small towers of rocks to warn of explosives, an often unheeded reminder not to

**“IT IS UP TO US—ORDINARY AFGHANS—
TO ENSURE THE PEACE, BECAUSE WHO ELSE WILL?”**

them a generation of children and young people born or raised outside Afghanistan. Here the returnees are registered and given modest allowances, along with basic information about what to expect in their village. The procedure takes a few hours and then they're on their way again, to their villages or to Kabul and other cities to look for jobs.

Preparing the returnees includes warning them about the millions of land mines and unexploded ordnance (known by the bureaucratic

leave the trodden path. Demining teams have made substantial headway, but it will take a decade or longer to finish the job.

Aid officials want to help refugees return to their villages so they can start rebuilding their shattered lives. But “many Afghans no longer know their country,” said UNHCR representative Yusuf Hassan. “They're afraid that it's going to be too difficult to start again.” Often all that awaits them are destitute farms and abandoned settlements. Some disillusioned Afghans





NATION'S PRIDE Deep ethnic and religious divides are briefly bridged at the magnificent Hazrat Ali mosque in Mazar-e Sharif, where Sunni and Shiite alike come to pray. The shrine is believed by many to be the tomb of the Prophet Muhammad's son-in-law.



BOYS' LIFE Whether pummeling electronic foes in an arcade or punishing their own flesh in a Shiite mosque during a religious holiday, the children of Kabul are subject to a diverse range of foreign and homegrown influences. Prior to the Taliban's five-year clampdown on all things judged un-Islamic, the forces of tradition and modernity had coexisted in this city. Many residents wonder whether the return of tolerance will last.

simply give up and go back to Pakistan and Iran.

Many of the returnees who stay in Afghanistan, especially those with some education, dream of working for the UN or one of the international NGOs in Kabul—understandable given the lack of job opportunities in the rest of the country. “I have never lived in Afghanistan except as a little boy,” said Shamsuddin, a carefully groomed young man with Pakistani-school English. Wearing jeans, a leather coat, and a CD Walkman dangling around his neck, he proudly told me that he came from a farming village in the province of Vardak southwest of Kabul, a bucolic region of wheat fields amid orchards of apples, pears, and peaches.

But when I asked Shamsuddin if he wanted to go back to Vardak, he smiled dismissively. “Some of my family are staying in Peshawar. Others are going home,” he said, indicating a group of older men and burka-covered women standing by a pile of suitcases with huge water thermoses and a television set. “I want a job as a driver. I want to do bodybuilding, like Sylvester Stallone. They have good gyms in Kabul. Maybe you can give me a job. Are you with the UN?”

Just as a society cannot fulfill its potential without engaging all its people, a landlocked nation cannot prosper without links to the outside. For Afghanistan that means roads. In the months following the Bonn Agreement in December 2001, which started Afghanistan's recovery process, humanitarian workers stressed the need to improve transportation links as a means of increasing trade and promoting peace.

Yet progress in public works has been slowed by funding delays. Until late last year, the 60-mile Jalalabad highway, a key artery that follows the Kabul River east from the capital toward the Indian subcontinent, was cratered with potholes, torn asphalt, and collapsed culverts. The road had seen little maintenance since the Soviet occupation, when Red Army convoys white-knuckled it through its deep defiles, often ambushed by mujahidin along the ridges above. Last summer, when money from international donors finally came through, the road was graded, and the driving time from Kabul to Jalalabad went from seven grueling hours to less than four.

“Building or repairing roads is a very effective



way to demonstrate change and show that life is returning to normal. It also helps inject cash into the local economy,” said François Large of Caritas Germany, which supports “food-for-work” road projects in central Afghanistan. In early March, when I trekked through the bitterly cold snow-covered Koh-e Baba mountains of Hazarajat, people told me they relied heavily on such projects for survival. Their heads wrapped

instability was casting a “long shadow over the whole peace process and, indeed, over the whole future of Afghanistan.”

For now the mandate of the 5,000-strong NATO-led International Security Assistance Force (ISAF) is to protect only Kabul, but many Afghans would like to see this expanded to other parts of the country. An additional 11,500 U.S.-led coalition troops—not part of the peace-

“HOW DOES ONE REBUILD A COUNTRY WHERE . . . A FOURTH OF THE CHILDREN NEVER REACH THE AGE OF FIVE?”

with scarves and NGO-issued sunglasses, local crews cleared the snow in return for a payment of seven kilos of wheat a day, which they used to feed their families or to sell for basics such as tea, sugar, medicines, and clothes.

Without good roads, policing the hinterland—a logistical strain at the best of times—is getting increasingly difficult as militant groups become more active. UN Special Representative Lakhdar Brahimi warned the Security Council earlier this year that the country’s growing

keeping body but actively engaged in hunting down Taliban, al Qaeda, and other antigovernment groups—are located outside Kabul at Bagram, a former Soviet air base, as well as in Kandahar, Jalalabad, and elsewhere.

The U.S. and others have argued that peacekeeping should eventually be handled by the Afghan armed forces, but neither the army nor the police has sufficient training or funding for salaries. While Afghan security forces operate throughout the country, many are beholden to

warlords and not seen as acting in the interests of ordinary Afghans. The police, many of whom haven't been paid for months, are regarded as increasingly corrupt. "The only ones the Afghans really trust are the [international] peacekeepers," noted an NGO coordinator in Kabul.

While traveling near the Pakistani border, I came across two Humvees, with U.S. troops taking a lunch break by the side of the road. For security reasons they were reluctant to talk about conditions in the area. Over the past months American and other coalition forces have been increasingly active in the east, trying to counter growing rebel resistance on both sides of the frontier. Much like the Soviets before them, however, coalition forces have found it difficult to track down their attackers, who simply merge in with the local population or disappear among the rugged forested mountains.

The U.S. soldiers—with their heavy gear, body armor, and high-tech equipment—looked as if they'd come from another planet. Local Afghans told me that the Americans have little contact with them and rarely patrol their villages on foot. "They always come with their vehicles. Or by helicopter," said one elderly farmer. "That's also what the Shouravi [Soviets] did." When the U.K. headed ISAF last year, British troops emphasized the importance of foot patrols, allowing closer contact with Afghans.

Attitudes toward the peacekeepers shift with the ambitions and fortunes of Afghanistan's regional warlords, of whom there are a dozen prominent bosses and scores of lesser ones. In Jalalabad I stopped by to see one of the big boys, Hazrat Ali, in a sprawling villa enclosed within a garden of orange and pomegranate trees. A member of the minority Pashai tribe from the north, Hazrat Ali had been largely unknown before September 11 but has since emerged as one of Nangarhar province's most powerful figures.

A hefty but refined-looking man in his 30s, Hazrat Ali was sitting in a plush living room when I arrived. In front of him lay a sheaf of letters requiring his signature, giving him more the air of a businessman than a military

WEBSITE EXCLUSIVE

Hear photographer Steve McCurry talk about changes in Afghanistan since the fall of the Taliban: Yes, refugees have been coming home, and a new school for girls is open. But, he says, it's a dangerous peace. "Afghanistan is on the brink." At nationalgeographic.com/ngm/0311.

commander. In fact, many warlords are focusing on so-called import-exports, including opium trafficking.

Throughout the east and south as well as parts of the north, farmers have freely planted opium poppies. Narcotics experts say this year's harvest may produce more than those of the 1990s, when Afghanistan was the source of 70 percent of the world's opium. Last year the Karzai government, with

the support of Britain, the U.S., and others, sought to eradicate the crop. But some fields were cut down too late, after the opium sap had been harvested, and it's thought that less than 20 percent of the crop was actually destroyed. Meanwhile the warlords pocketed monies meant to compensate poppy growers, causing considerable anger.

Antinarcotics specialists advocate a long-term commitment to help farmers plant alternative staples. "The real problem is that it is far more lucrative to grow opium, sometimes ten times as much, than wheat or other crops," said one British expert. When I asked a Western aid representative in Jalalabad whether Hazrat Ali was benefiting from the trade, he shrugged. "You've seen all those poppy fields at the foot of the Safed Koh mountains on the way up to Tora Bora. If you're one of the main warlords in the area, of course you're going to benefit, even if you're not actively trafficking," he said.

Outside Herat, along the main road to the Iranian border, I visited one of the customs points run by the warlord Ismael Khan, where trucks have to pay a dollar for each unit of freight carried. (A load of 800 tires equals \$800 in import duties.) This one post could be bringing Khan more than a million dollars a day. Earlier this year Karzai threatened to resign unless the warlords agreed not only to submit publicly to his authority but also to



channel customs earnings to government coffers. His threat seems to have produced little effective change.

If the warlords and other factions continue to undermine the central government, it's only a matter of time before the rest of the world gives up on Afghanistan, and the country sinks again into conflict. The immediate signs are not promising. By last August security was at its worst since the fall of the Taliban. Bands of pro-Taliban fighters had stepped up activity in the region. Clerics who supported the Karzai government and denounced the Taliban's call for a jihad against U.S.-led troops were being assassinated. Now hardly a day goes by without an armed attack, bombing, or rocket assault

VEILED OUTLOOK Old ways and old taxis hang on in Mazar-e Sharif, where women still take a backseat. Shell-shocked by war and battling abysmal living standards, Afghans hope that, along with a measure of freedom, their country has gained a future.

against coalition or government positions. In Kandahar and other "nonpermissive zones" (a military euphemism for dangerous areas), the attacks have prompted international agencies to curtail operations.

And yet everywhere I went, I was struck by what may prove to be Afghanistan's greatest strength: the desperate desire of ordinary Afghans for peace. Too often over the years I've seen how religious and other groups are driven more by greed than by the interests of the nation, while outsiders—whether the Americans and Pakistanis, or the Russians and British before them—imagine they can control Afghans rather than encourage them to shape their own destiny. Even Afghans themselves, the Taliban or the Panjshairi mafia, regularly fall into this trap by believing they can acquire loyalty through money, favors, or fear. As the saying goes, "You can always rent an Afghan, but you can never buy him"—and many have learned its truth through bitter experience. The question now is whether Afghans can, by force of will, make their own peace and make it last. □





MYSTERY OF THE
SUN GOD'S
SERVANT

BY ALAIN ZIVIE

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, PARIS

PHOTOGRAPHS BY KENNETH GARRETT

HYPOGÉES

A STUNNING TOMB, SEEN HERE FOR THE FIRST TIME,

offers clues to the turmoil stirred up by Egypt's radical Pharaoh Akhenaten more than 3,300 years ago. The man who intended to use the tomb (right), a guardian of temple treasures, included the names of Akhenaten, his queen, Nefertiti, and their patron—the sun god Aten—in the original reliefs. But as political circumstances changed, the names were defaced (above), and this loyal servant never used the tomb.

What became of him?





ALAIN ZIVIE CONFERS WITH ASSISTANT BALAH KHASSABALLAH (ABOVE) AND ANTIQUITIES INSPECTOR SAYED GAD (RIGHT).

AKHENATEN ROCKED EGYPT BY OPPOSING THE PRIESTS OF AMUN, THE SUPREME GOD, AND WORSHIPING ONLY THE SUN GOD ATEN.



A lot of experience and intuition, and a little luck, led me to this tomb in the ancient cemetery of Saqqara. With support from the French Ministry of Foreign Affairs, I had already found burial sites carved into a cliff there (above), including one prepared for a top official of Ramses the Great (see "A Pharaoh's Peacemaker," October 2002) and another belonging to a woman named Maia, the wet nurse of the famous Tutankhamun, a successor of Akhenaten. As my crew filled sandbags to buttress our excavations, their shovels uncovered an opening in the rock. Once the sand was removed, I surveyed in amazement a

colonnaded funerary chapel with a carved stone stela (above). In the cliff behind it we discovered a pair of rooms lined with reliefs, then stairs leading to an unfinished burial chamber (diagram, right). Inscriptions reveal that the owner had two names, Raiay and Hatiay. The son of a goldsmith, he became a top administrator of the treasury of the temples of Aten in Akhetaten (the new capital).





and Memphis (the old one). In other words, this man looked after gold and other offerings to Aten in two of Egypt's key cities. Surely he had close connections to the great Akhenaten himself. Many of the tomb's reliefs reflect Raiay's devotion to the pharaoh's extreme religion. But some of them clearly were changed, apparently during Raiay's lifetime. Now the question became—why?

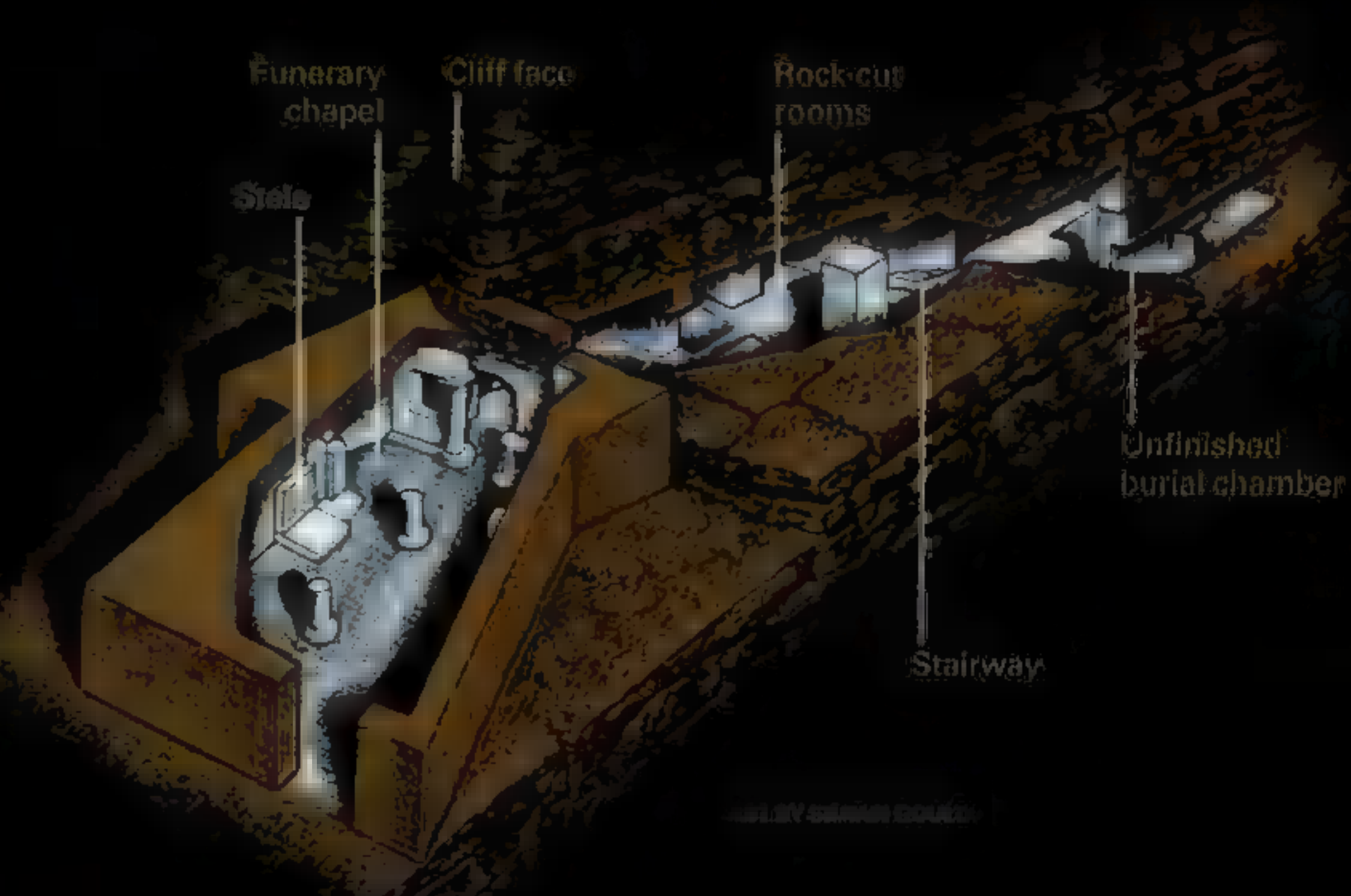


ILLUSTRATION BY SIMONE BONDINI

Beautiful reliefs crafted by the country's best artists adorn Raiay's tomb, but their purpose went beyond decoration. Invested with magic, they were meant to smooth the way to the afterlife and sustain the deceased forever. In the "opening of the mouth" ceremony (right), a priest restores the senses to Raiay's mummy, which a mourning relative holds upright. The appearance of this scene shows that such traditional preparations for eternity continued even during Akhenaten's unorthodox reign. In keeping with the pharaoh's worship of the god Aten, however, the accompanying text omits the usual

references to Osiris, god of the afterlife. In fact, all the reliefs on the tomb walls pay homage only to Aten. In striking contrast, the stela at the tomb's entrance includes the names of several Egyptian gods. In one panel Raiay and his wife make offerings to Osiris (below). Inscriptions mention gods such as Ptah, the patron of Memphis, and Amun, to whom Raiay's wife offered sacred songs. This stela is key to interpreting the tomb. It may have been added after the death of Akhenaten, when Raiay and his contemporaries were cautiously embracing the old ways once again under a new pharaoh, Tut.





THE STELA SAID THINGS THAT COULD NOT
BE WHISPERED DURING AKHENATEN'S REIGN.
IDEAS THAT HAD BEEN POLITICAL LIABILITIES WERE
POLITICALLY CORRECT AGAIN.



A CONDEMNED MAN'S IMAGES WOULD HAVE BEEN ERASED TO CUT HIM OFF FROM ETERNITY. RAÏAY REMAINED UNTOUCHED, SO HE MUST HAVE SURVIVED THESE DIFFICULT TIMES.



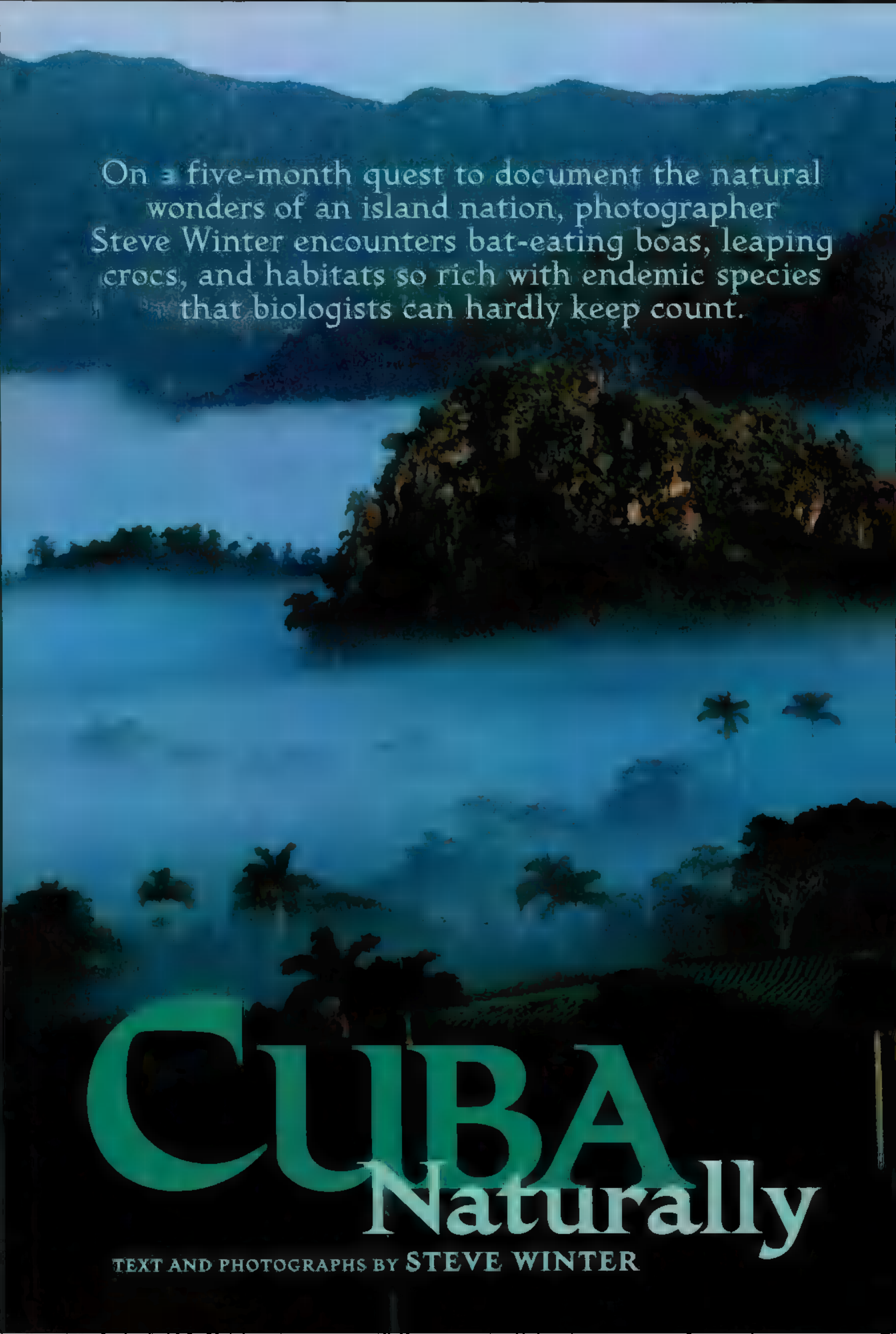
Raïay built this tomb for his wife as well as himself. She appears seated behind him (left) and carrying an offering of flowers (right). But no one was laid to rest here. Raïay's image (below) guards the passage to an unfinished burial chamber. As people retreated from the late Akhenaten's obsessions, this tomb probably became a liability, despite the alterations. Feeling the heat, Raïay seems to have abandoned the burial site altogether. He may have salvaged his career, though, using political connections. Inscriptions tell us that his wife's name was Maïa. Was this the same Maïa whose tomb I found nearby, the woman who had been King Tut's wet nurse? If so, did her influence help Raïay regain royal favor? And was he finally buried in a new tomb near his wife's? The answers could yet lie hidden in the cliff at Saqqara. □



PHOTO PREVIEW

Examine other details of the artwork in this rock-cut tomb and learn more about the sun god Aten at nationalgeographic.com/ngm/0311/.



A scenic landscape of Cuba, featuring a river in the foreground, a large tree on the right, and mountains in the background. The scene is bathed in a soft, golden light, suggesting a sunrise or sunset. The overall tone is warm and natural.

On a five-month quest to document the natural wonders of an island nation, photographer Steve Winter encounters bat-eating boas, leaping crocs, and habitats so rich with endemic species that biologists can hardly keep count.

CUBA

Naturally

TEXT AND PHOTOGRAPHS BY STEVE WINTER



Islands in the clouds, limestone outcrops called *mogotes* push through morning mist in Cuba's fertile Valle de Viñales. Once part of the Jurassic seafloor, mogotes uplifted some 40 million years ago and are still rising today, littered with fossils of ancient marine life. Rivers and seeping rain have eroded the steep mounds, leaving them riddled with caves.



On its last leap, a grasshopper makes an easy meal for *Anolis porcus*, a native lizard whose skin can lighten or darken as needed for camouflage. Of the island's known reptile species (125 so far), nearly 90 percent live only in Cuba, which has the highest endemism in the West Indies.



Photo: © David J. Green
Illustration: © David J. Green

Postcard perfection of sky and sea exists in sublime isolation off the western edge of Cuba at the Península de Guanahacabibes Biosphere Reserve. One of six such reserves in the nation, it protects waters, reefs, tropical forests, and coastal groves from excessive human use.



Scarce as it is fragile, the orchid *Tetramicra malpighiarum* fans its petals to barely an inch across. It's one of many stars in Desembarco del Granma, a World Heritage site.



In hundred-degree heat we slogged through a brutal expanse of swamp on a day we'd remember as hell. Attacked by relentless mosquitoes, we wrenched our boots from the mud, step by step. A horizon of pink pulled us forward until our quarry came clearly into view: some 70,000 nesting Caribbean flamingos and countless chicks, the largest colony of these magnificent birds in the Western Hemisphere. I sat on an abandoned nest and readied my gear. Nearby, on a conical mound of mud, a flamingo bent toward its chick to offer a broth of fats and proteins. Undisturbed by my camera, the pair carried on, allowing me to capture the intimate touch of two beaks poised with grace and purpose (right).

That moment redeemed the day for me and for my friend Juan Soy, who called our visit to the breeding ground spectacular. A biologist at the University of Havana, Soy works with Cuba's flora and fauna division to help oversee 48 of the country's 263 protected natural areas, which cover nearly 22 percent of Cuba's territory. The critical flamingo nesting grounds lie within Humedal Río Máximo-Cagüey, which recently became one of six places in Cuba added to the Ramsar Convention's list of Wetlands of International Importance. The site's daunting inaccessibility may be its salvation. The same could be said of Cuba's vast—and largely unknown—natural riches.

Before this trip, Cuba for me meant Castro and cigars, alluring beaches and intoxicating Afro-Cuban rhythms. I now know it as a place of unimagined biodiversity. With help from Cuba's Ministry of Science, Technology, and the Environment, I gained unprecedented access to some of the most pristine island wilderness in the world. Traveling thousands of zigzagging



miles over five months, I photographed some rarely documented wildlife behaviors and came to view Cuba as another Galápagos, preserved by its lack of development and by the will of a people committed to conservation.

Stretching for 750 miles, Cuba embraces the greatest diversity of landscapes and life in the West Indies. These habitats arose from soils born of various kinds of rocks cobbled together as the Caribbean plate smashed against the North American plate, creating a submarine ridge that eventually gave rise to the Greater Antilles. It's a long, narrow land of extremes—and I experienced my share of them.

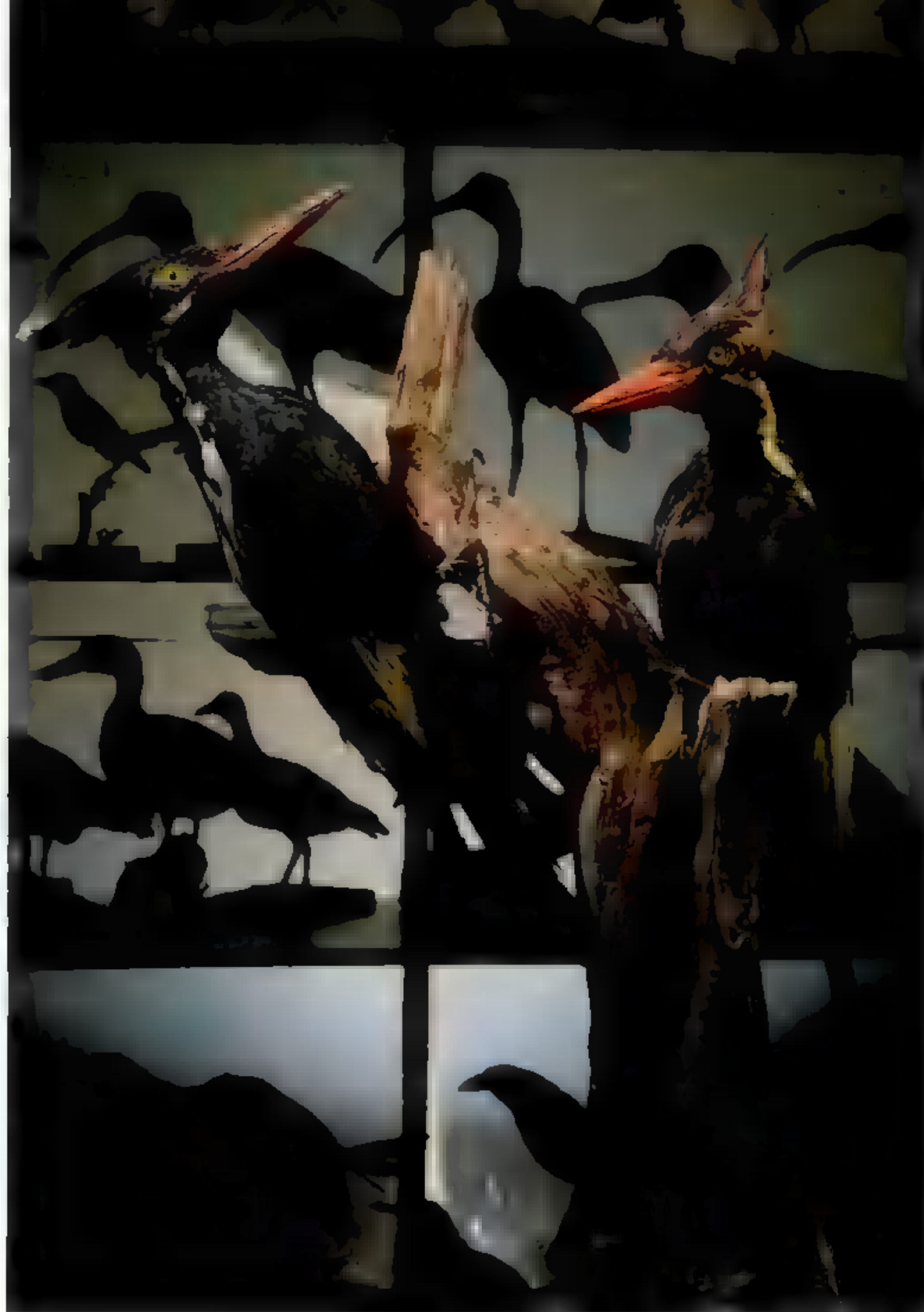
In winding *mogote* caves I held the crumbling bones of extinct mammals, long ago done in by human hunting, disease, and predation. I watched one of the world's tiniest frogs scrambling through the leaf litter of a riverine forest. I joined a fruitless two-week search for the nocturnal solenodon, an insect-eating mammal hunted to near extinction by feral dogs and cats. Dangling from a rope 150 feet off the ground, I photographed an endemic *ceibón* tree growing straight out from the face of a cliff.

And then, of course, there were the swamps. At 1.5 million acres the Ciénaga de Zapata Biosphere Reserve is Cuba's largest protected area, designated as a Wetland of International Importance, mainly for aquatic birds. But I had come for the crocs. One remote and still unprotected corner of the Zapata swamp is home to more than 3,000 Cuban crocodiles, the largest remaining population of this endangered—and fierce—species.

Toby Ramos, Cuba's veteran croc biologist, and John Thorbjarnarson of the Wildlife Conservation Society led our expedition to tag and study the reptiles. Poling boats in hard rain, it took two days to reach camp. By day we'd catch crocs with relative ease for one disconcerting reason: They're so aggressive that instead of fleeing our approach they'd hold their ground or move in to check us out. After snaring, measuring, sexing, tagging, and releasing crocodiles, we'd head back to camp, endure flesh-eating parasites that devoured our feet, and hope that curious crocs wouldn't break through the protective nets we'd strung around our site. As with the flamingos, one moment made it worthwhile: When a hefty eight-footer leaped out of the water (pages 72-73), my camera was ready—and Cuba became unforgettable.



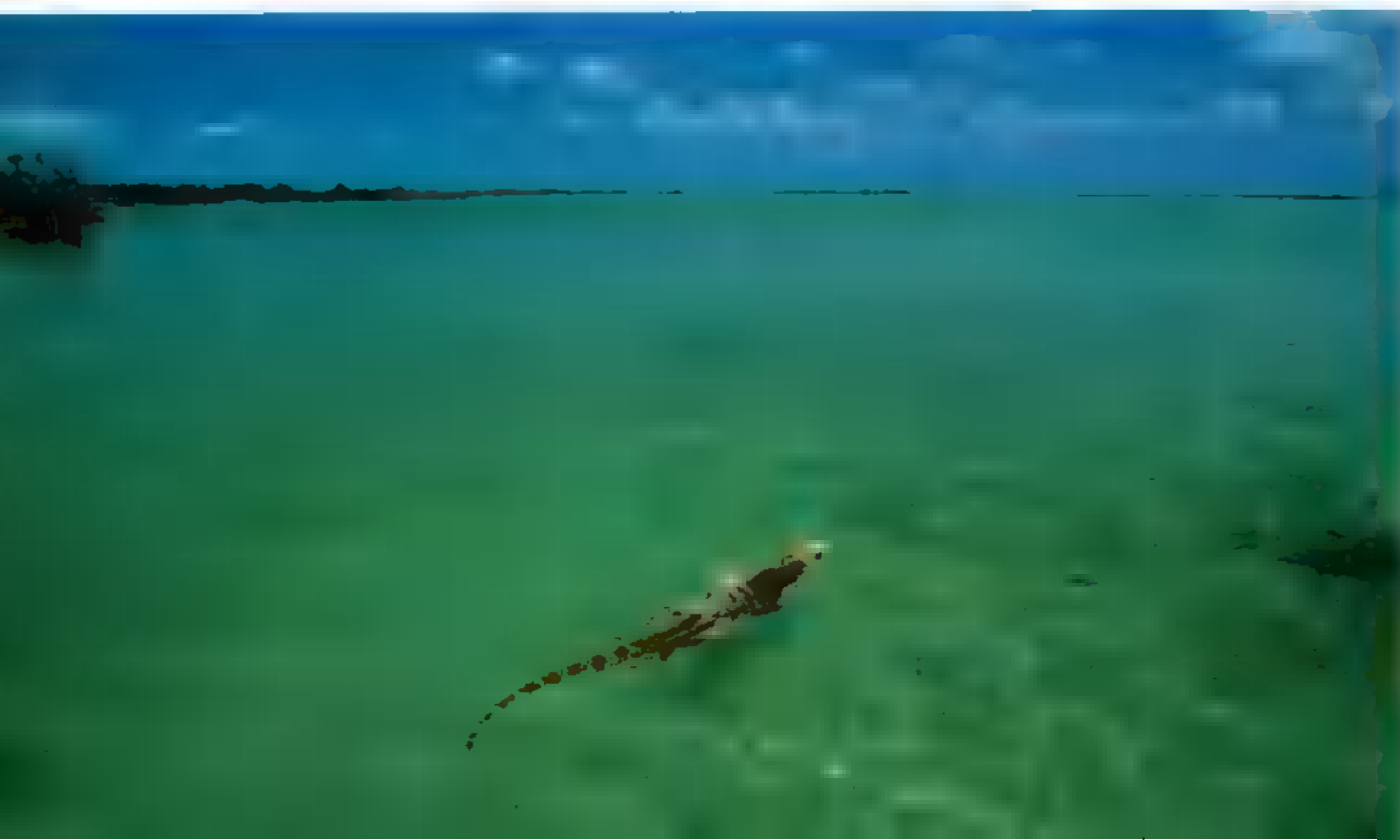
Ivory-billed woodpeckers from the 1930s pose in Cuba's National Museum of Natural History. Once plentiful, the species is now believed extinct, though biologists still search for survivors. Briefly freed from the museum, the skull of an extinct Cuban monkey (left), similar to a South American species, hints at the existence of a land bridge that likely linked Cuba to South America 35 to 37 million years ago. The skull proves that nonhuman primates once lived in Cuba. None survive today.



Patchwork Paradise
An archipelago of more than 4,000 islands, Cuba embraces multiple ecosystems from mangroves and small coastal deserts to rain forests. Such habitat diversity has given rise to thousands of species of plants and animals that live nowhere else on Earth. They may stand a strong chance of survival: Fully one-fifth of the nation lies in protected areas.



As evening falls, an American crocodile hatches in Monte Cabaniguán Wildlife Refuge, which holds the world's largest known nesting congregation of this endangered species. As many as 300 nests crowd the refuge's tiny beaches, where one croc mother may dig up another's nest in the frenzy to lay eggs. Solitude reigns in Zapata National Park as a terrestrial Cuban iguana takes a swim (below), a rarely photographed behavior.





Framed by the flowing Río Toa, a minuscule *Eleutherodactylus limbatus*—one of the world's smallest frogs—poses on a fingertip in Cuchillas del Toa Biosphere Reserve. With more than 900 endemic species in habitats ranging from cloud forest to coral reef, this reserve serves as a crucial storehouse of biodiversity in the Caribbean. To the west in Viñales National Park the fossil of a Mesozoic ammonite (below) attests to Cuba's submarine history.





An eight-foot Cuban crocodile rockets out of Zapata swamp, powered by its tail and its hunger for *jutiá*, a native rodent strung as bait. Croc biologist Toby Ramos (above) captures the reptile for analysis, part of a Wildlife Conservation Society study aimed at preserving the endangered species.

Ever seen a ravenous crocodile take flight? Now you can. Watch video footage of this leaping male croc at nationalgeographic.com

A tree fern feathers the skyline over the Sierra del Cristal in the eastern highlands. Across Cuba, pine seedlings are re-greening slopes and fields long ago denuded for sugar and coffee plantations.





Holding a *jutia*, Javier Moriche (above) has reason to smile: There's protein for dinner. In a land where meat and money are scarce, some Cubans dispatch dogs to hunt these largely tree-dwelling rodents, ten species of which live in Cuba. Most are threatened or endangered, but some are plentiful, especially in sparsely populated highlands like those near Moriche's home in the Sierra del Rosario Biosphere Reserve. Here the family earns extra cash by burning invasive tree species for charcoal and replanting native pine, part of a government-paid program of reforestation.

Across Cuba a quiet revolution of organic gardening has taken root. With scant funds for pesticides and tractors, farmers near San Andrés (below) use natural methods to control bugs and tend fields. Today small plots yield a bounty of fresh vegetables, a success in the struggle for sustainable agriculture.







Vertical virtuosos, Raudel del Llano, at top, and Eddy [name obscured] the practice rappelling, anchored at [name obscured] [name obscured] [name obscured]. Prized for green bark used to [name obscured] the packets of Cuban tobacco, the endemic [name obscured] sprout from the sides of mogotes in [name obscured] around the Valle de Viñales, one of the world's top tobacco-growing regions.





A lush slope in Viñales yields to the mouths of tunnels that twist through Cueva del Panal, one of countless fluvial caves bearing the bones of extinct sloths and other vanished mammals.

The rushing wings of four million bats spin the only breeze in the night. Hungry boas cling to cave walls and gnarled branches. A quick strike, a brief squeal, and a bat falls victim to the hunt.

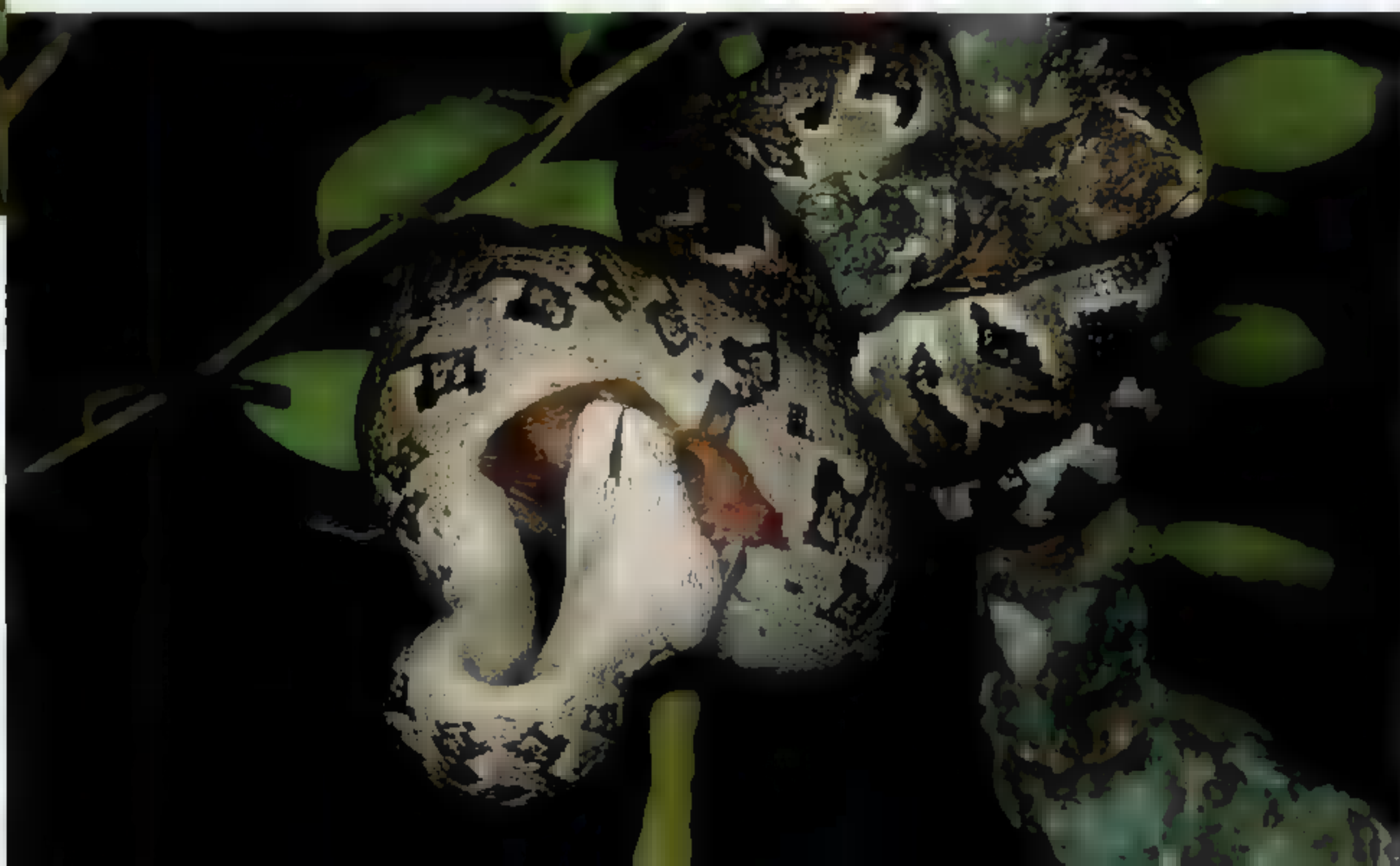




In eastern Cuba, up a mountain of exposed rock so razor sharp it shreds boots, there's a cave hot and rank with the smell of bats. Some four million bats of 12 different species live in this cave, including *Natalus lepidus* (above), one of the world's smallest. At 7:30 every night bats begin to emerge, the smallest species first, then larger ones, hour after hour, a living wave of fluttering bodies in search of insects and fruits. Outside the cave Cuban boas dangle from trees (left) waiting patiently for a passing meal. A boa will curl back, strike like a spring to grasp a bat in its mouth, then suffocate the prey in muscular coils (below) before gulping it down. After five nights of trying I was able to capture these rarely seen behaviors, part of what makes Cuba a naturalist's unspoiled Eden.

WEBSITE EXCLUSIVE


See flamingos soar and join our forum—Has the U.S. embargo affected Cuba's environmental practices?—online ■ nationalgeographic.com/ngm/0311.





A storm rolls toward jagged shores that lend the island rough-hewn charm. As sea levels rise, dip, and swell again through time, Cuba remains a showplace of evolution's slow magic. □





Carved through
mountains and malarial
jungles at a frightful
human cost, the
infamous World War II
Allied supply line
that linked India to
China now conveys
gold, teak, opium,
and the promise
of a troubled
nation's future.

BLOOD,
SWEAT,
AND TOIL
ALONG THE

BURMA



ROAD

By DONOVAN WEBSTER
Photographs by
MARIA STENZEL



LABORERS dig out a road begun in 1942 to link Ledo, India, and Kunming, China, across Japanese-held Burma. U.S. generals felt the road was vital to keep China in the war.



BURNING BUCKETS of diesel fuel light up the night for a crew clearing a landslide, one of the countless aggravations faced by U.S. Army engineers and their exhausted crews.



BOGGED DOWN GIs were among the 28,000 Americans and 35,000 Asian workers who built the tortuous route across mountains and sweltering jungles. Hundreds were killed by disease, accidents, and Japanese attacks.





NATIONAL ARCHIVES (TOP AND BOTTOM LEFT), BERNARD HOFFMAN, TIME-LIFE PICTURES/GETTY IMAGES (CENTER LEFT), HULTON DEUTSCH/CORBIS (ABOVE)

BOUND FOR BATTLE, Chinese troops under U.S. command march down the new road in October 1943 toward a decisive showdown with the Japanese army at Myitkyina. An American P-40 Warhawk provides cover.



LIBRARY OF CONGRESS

SELF-DESCRIBED as impatient and vulgar, U.S. Gen. Joseph "Vinegar Joe" Stilwell (left, at center) was tasked with building the road and pushing the Japanese out of Burma, as was his chief engineer, Gen. Lewis Pick, standing. Japanese resistance was fierce. Medics (below) treat casualties from the battle of Myitkyina, which took ten weeks and more than 2,000 lives.

"The road is going to be built—mud, rain, and malaria be damned!"
—Gen. Lewis Pick to his engineers, 1943



NATIONAL ARCHIVES



A Hellish Lifeline

By 1937 Japan was set to cut off China's trade with the world. To supply his army, Chinese leader Chiang Kai-shek built a highway to Burma (Myanmar) to reach a rail line from the port of Rangoon. After the Japanese invaded Burma and closed the highway in 1942, the U.S. built a 500-mile spur from Ledo, India, and seized the highway from the Japanese. Until the entire route was complete, supplies were airlifted from the Ledo region to Kunming over the Hump—a perilous flight across windy mountains that claimed 607 aircraft.

Japan occupies Burma, May 1942

Japanese-occupied territory, August 6, 1942



Burma Road, 2003
 Despite the perception of it as a road, the Burma Road was a series of trails and paths that were used for centuries.

Connected to the port of Calcutta by rail, Ledo became the main source of material to China. Winston Churchill declared the road project "an immense, laborious task, unlikely to be finished until the need for it had passed."

Lashio
 Before the Japanese overran it in 1942, Lashio was a critical entrepôt for the Allies in Southeast Asia. Food, fuel, medicine, and munitions arrived by rail from Rangoon and were then trucked to China on the Burma Road.

Kunming
 Kunming was the destination port for supplies arriving over the Hump via the Ledo and Burma Roads, a 1,100-mile route that was completed just six months before the war ended.

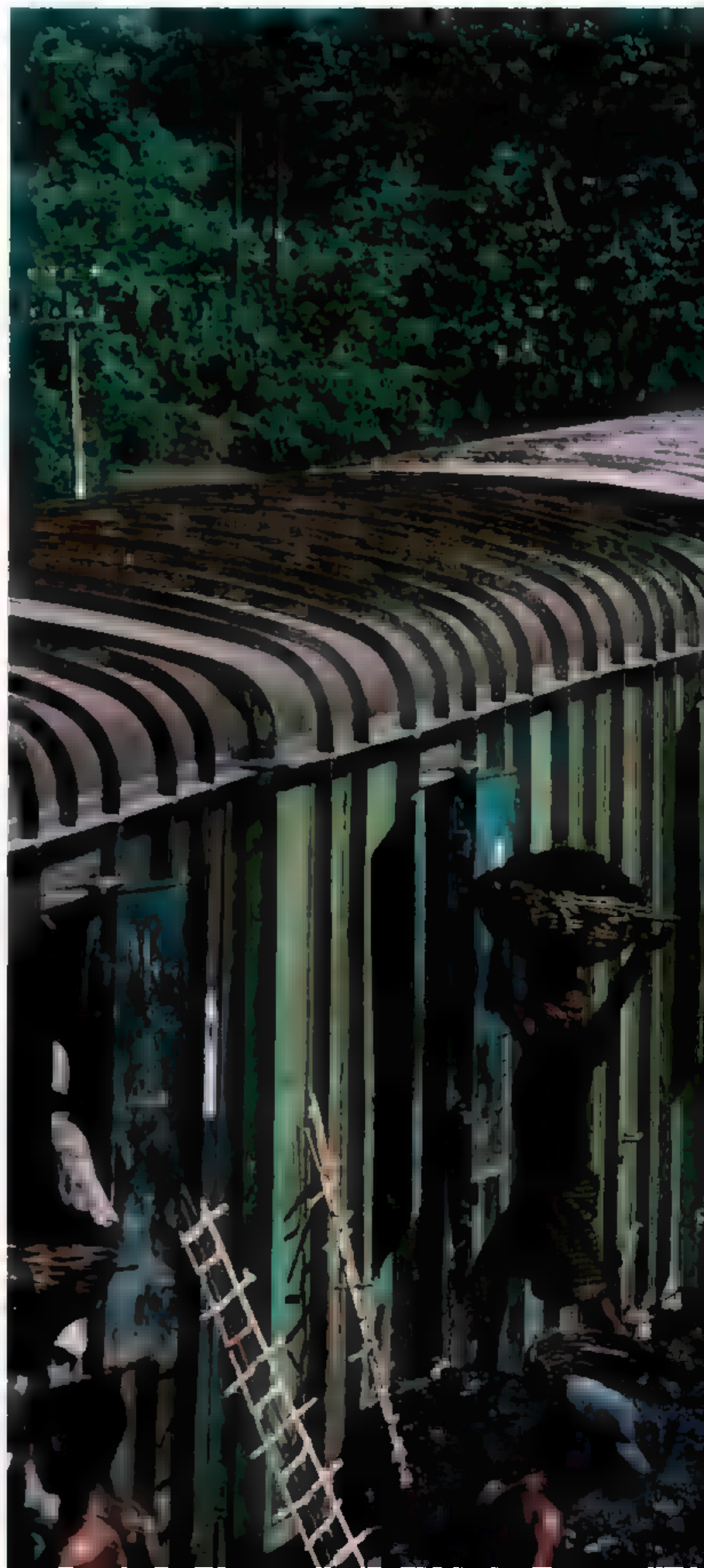
THE OLD SOLDIERS urge me not to go looking. They'd prefer to think that the road they hacked across India's steep Patkai Range and down through the jungles of Burma to China during World War II is gone. That its two stringy lanes—now six decades old—have been devoured by time and landslides, jungle monsoons and swampy earth.

But right now, step after step, I'm crossing a steel bridge near the northeastern Indian village of Jairampur: a dilapidated span the old soldiers laid above the muddy Khatang Nalla in early 1943, the first true bridge of the Burma Road's 1,100-mile length.

I leave the bridge's far end, walking between walls of rain forest that rise like green tapestries a hundred feet high. As I walk, I'm thinking of Mitchell Opas, now 86, who served as a U.S. Army medic during World War II and whom I've interviewed at reunions from Massachusetts to Texas. "If that road's still there," Opas has instructed me, his finger pointed in my direction for emphasis, "then you send pictures of it."

Up the pavement ahead of me, dogs doze in the sun as children run back and forth across the otherwise empty road's chipped asphalt. Two hundred yards farther along, a wood-planked district police station encircled by razor wire sits off the road's left shoulder. When I begin to pass it by, a green-uniformed sentry—his assault rifle slung across his belly—lifts his weapon. Using the gun's black barrel, he motions me inside the front gate. "Please," he suggests, "come inside."

I'm led to the commander's office, where I'm offered a handshake and a chair. The commander is an imposing man in his 40s named G. K. Grung, his olive uniform festooned with flashing gold stars. Seated behind a wooden desk, he examines my passport and visa. He's especially interested in my Restricted Area Permit, the paper authorizing me to travel the final 18 miles of road inside India's otherwise off-limits state of Arunachal Pradesh. Here in Arunachal's jungle, the road crests a 3,727-foot mountain notch called Pangsau Pass, which constitutes



India's hotly defended border with Myanmar, the nation formerly known as Burma.

Commander Grung looks up. "I'm sorry," he says, "but we have been issued new orders about the road to Pangsau Pass. No visitors are allowed past this point. Unfortunately, this means you." He smiles, then taps his desk with his right forefinger. "There is significant rebel activity here at the moment. The jungles are something of a no-man's-land. We cannot assure your security. Therefore, you cannot proceed."

I smile back. This is how my journey along the Burma Road begins: with recollections of old soldiers and a warning backed by machine

guns as I get close to India's touchy frontier.

The Burma Road has many names, and in reality it is not one road but two, completed seven years apart and connected. Some people call it the Ledo Road, because it starts in the coal town of Ledo in northeastern India's state of Assam, at the spot where the rails from Calcutta's seaport finally peter out after more than 500 miles. During World War II, cutting a road from Ledo over Pangsau Pass provided a way to move weapons and goods into Japanese-besieged Burma and China. (The hurriedly built first section—the original Burma Road—was created as a supply track by Chinese laborers in



Moving mountains of coal by hand, laborers load boxcars for a dollar a day in Ledo—a scene little changed since the U.S. Army arrived in 1942 to begin building the road some soldiers called "Pick's Pike."

1937 and 1938, following a Japanese invasion of China that began closing its seaports.) Some others call it the Stilwell Road, since its completion was overseen by U.S. General Joseph "Vinegar Joe" Stilwell during the ferocious fighting against the Japanese in Asia. The men who built the Ledo section between 1942 and 1945 sometimes called it Pick's Pike, after its chief engineer, U.S. Gen. Lewis Pick. Other troops nicknamed it the "man a mile road," for the regularity with which the roadbuilders died by sniper fire or malaria or mortar explosion or accident. But mostly, if people know the road's

Barooah makes a comfortable living on his family's Hollonghabi Tea Estate, the road is indisputably the area's economic artery.

As the sprightly and enthusiastic Barooah and I stroll his 383-acre plantation a few miles from Ledo, a green quilt of chest-high tea plants covers the hillsides beneath a swirling morning mist. I watch full dump trucks and packed buses, cars, and motorized rickshas clatter along the pavement, which functions as the eastern boundary to Barooah's tea bushes.

The road seems to be carrying everything at once. A green pickup truck, its bed covered by

"I'm sorry for... your greeting, but you are the first

name at all, they call it simply the Burma Road.

Today the remains of these roads—the 1937-38 supply track and the 1942-45 spur—link India, Myanmar, and China, winding through the lands of at least three dozen mountain and rain forest peoples, some nearly as isolated today as they were in the 1940s—or the 1840s, for that matter. All along the way you can still find the "red," "green," "white," and "black" trades (rubies, jade, heroin, and opium), as well as commerce in gold, sapphires, teak, diamonds, oil, rubber, and dozens of other commodities.

But while the Burma Road is still there, it exists only as sweat-scented memories for most of the men who built it and fought for it, and while the name clings exotically to history, the route seems lost to time. My goal, over the next two months, is, in a sense, to reopen the Burma Road. Nearly half its length is off-limits to foreigners, but thanks to the goodwill of the governments of India, Myanmar, and China, I've been allowed inside a world few Westerners have seen since the closing days of World War II. Still, as Commander Grung has already intimated, insurgencies and other unforeseen events may render this retracing harder than originally thought. It promises to be a heck of a trip.

“Whatever you call the road,” Ranjit Barooah is saying, “it’s famous in this part of the world. For the people who live along it—people all the way to China—the road is a way of life.” In Assam, in India’s resource-rich Himalayan foothills west of Pangsau Pass, where

a screened box, transports perhaps a ton of tea leaves to a nearby processor. On the far side of the shade-dappled pavement, several shops have opened for business, selling everything from Indian newspapers and cheap batteries to the season’s fresh crop: oranges. Motor scooters rattle past. And through it all stroll the sacred cows, oblivious to the chaos around them.

Resources like tea, teak, and coal have been cash earners here since 1823, when a soldier named Robert Bruce—on reconnaissance for British colonization—was served a steaming cup of the local leaf. Soon plantations across the region were exporting Assam tea, which today is considered among the world’s tastiest varieties. Following the tea planters came the teak harvesters, who began extracting the stands of resilient hardwood ahead of every new tea-plantation clearing. Then in 1870 a British physician named John Berry White, on a hunting expedition, saw jungle tribesmen burning black stones. Within a year a 2.4-billion-metric-ton coal reserve was identified, and the Ledo Mine had opened. Today the mine exports up to 800,000 tons of coal a year from a rail siding along the road’s shoulder, just northeast of town.

These riches have come at a cost. Angered by the arrival of multinational tea syndicates and resource-harvesting companies—and with them a flood of inexpensive laborers—a core of unemployed locals called the United Liberation Front of Assam (ULFA) engages in an often brutal insurgency. Travel in the region for a few days, and you’ll likely see newspaper accounts of rebels blowing up processing plants or popping up on isolated roadsides to tear apart workers’

buses in hails of bullets. During my stay here, in fact, the government accused the ULFA of carrying out two incidents in which grenades were tossed into markets or meeting spots, killing dozens of people.

The fighting back in 1942 took place on the other side of the narrow, steep ridges that separate northeastern India from Burma. Undeclared war had been going on in Asia for a decade: Beginning in 1931 the resource-hungry Japanese had invaded and occupied much of eastern China, preparing to capture the country's seaports and cut off its trade to the world.

George Erban, a U.S. engineer and a shovel operator on the road. "Every day was the same. Up at dawn, sweat and work until dark. It was so hot sometimes, where we'd lay concrete, it would be dry in an hour. We'd cut a stretch of road over some jungle mountain, and the monsoon would wash it out. But we kept going. We had no choice."

Entering the jungles of Myanmar today, I am coming to understand what an epic undertaking the road was. Nearly three travel-wracked weeks after visiting Ledo, I am—once again—just a few miles from Pangsau Pass, this time

white person most of these people have ever seen."

In response, China's Nationalist leader, Chiang Kai-shek, in 1937 ordered the creation of a road out of southwestern China to the railhead at Lashio, Burma, allowing trains from Rangoon's harbor to reach Chinese cities. But in early 1942 Japan overran Burma, capturing the road.

It became the job of General Stilwell to retake northern Burma, reopen the Burma Road, and build the Ledo Road 500 miles through mountainous jungle, connecting the Burma Road with India. (Once the Ledo Road and Burma Road were joined, Chiang Kai-shek renamed the entire passage the Stilwell Road.) To keep China in goods and weapons while the road was being built, Stilwell cranked up a massive airlift between China and India over windy, 14,000-foot peaks: the infamous Hump route, which eventually claimed 607 supply planes.

But the Hump's perils were equaled by those facing General Pick's construction battalions. In 15 months Pick's men, despite snipers and malaria, moved 13.5 million cubic yards of earth to cut the roadbed—enough dirt, wrote Tillman Durdin of the *New York Times*, to build a wall ten feet tall and three feet wide from New York City to San Francisco.

"It was crazy, and it was miserable," says

HEADHUNTERS no more, Naga elders in the remote village of Namlip remember GIs giving out chocolate and jeep rides, says Ah Naung, a Baptist minister in his 80s. There have been no reports of head-taking in the area since 1991.



approaching the border from its Myanmar side.

It's been a long, muddy trip. Because Pangsau is closed to outsider traffic, I've been forced to fly from northeastern India through Calcutta to Yangon (the former Rangoon). Then, once inside Myanmar, I hopped another series of airplanes, taxis, trucks, and conveyances (including a 1943 Willys jeep left over from the war and, later on, a pair of elephants) to approach the Myanmar side of Pangsau along the road.

For the past hundred miles I've watched the road go from pavement to gravel to mud to its current state, a single-track footpath through enclosing jungle. As that path climbs one last mountainside before Pangsau, I find perhaps the most remote village along the road's length: Namlip. Like many villages in this part of Myanmar, it is home to the Naga, a people reported to be active headhunters as recently as 1991. That's when my friend, Delhi-based backcountry guide John Edwards, visited a village southwest

of here just a week after an intervillage disagreement. The men from one village had “hacked 28 heads from the enemy village,” he told me. “Then they brought them home as souvenirs.”

It is therefore with some trepidation that I approach Namlip, whose low-roofed, palm-thatched stilt huts crowd the hills on both sides of the trail. As I step out of the jungle and into the village’s grassy clearing, a gaggle of children—barefoot and wearing short pants and ragged T-shirts—spot me. Shocked, they streak for home, leaving only chickens and pigs to greet me. Ten minutes pass before a tiny sticklike

impressions and ideas—perhaps left over from the war—have probably been overtaken by the reality of today.”

T rue to Ah Naung’s statement, the northern Myanmar of today—all of contemporary Myanmar, in fact—is far different from the reality confronting Stilwell’s troops when they invaded from India in October 1943. But although there are no known headhunters today, Myanmar isn’t exactly a friendlier place, as anyone who has opposed the militaristic

Ruili is full of neon, billboards, and blaring music.

figure emerges from a hut up the hill on the left.

He’s an older man, dressed in a blue Nehru-style jacket, leather sandals, and a cloth sarong, or *longyi*. As he approaches, he is smiling—hardly the threatening headhunter—and I notice that his pierced earlobes dangle low.

“Hello,” he says in Naga, which my guide translates. “I am Ah Naung, more than 80 years old. Welcome to Namlip. Welcome.” Then Ah Naung makes an admission that startles the explorer in me. “I’m sorry for the coldness of your greeting, but you are the first white person most of these people have ever seen. You are the first white man I myself have seen since 1945.”

Ah Naung shakes my hand. He calls loudly back up the hill toward his hut, ordering us some tea. For the next 90 minutes as we visit, a crowd gathers to stare and listen.

Life in Namlip today, Ah Naung says, remains much the same as it was before 1942. “We farm and hunt to eat,” he says. “We live very simply. I would like to tell you the road has changed our lives—but no. We use it to travel, though there was always a trail there, even before the war. Rice is transported to us along the road, since rice is difficult to grow here.”

When I ask about head-hunting, Ah Naung laughs.

“Oh no,” he says. “Not in Namlip anymore. In other Naga villages, I don’t know, but not *here!*”

Ah Naung explains that Namlip, like much of this area, is now mostly Christian. He became a Baptist in 1961 and is now the village’s minister. “I don’t know what the outside world thinks of us, but because of our isolation, outsiders’

government can attest. And because the country’s leaders have until recently pursued an isolationist policy, there is also no longer a passable road to India in this part of the country.

Working my way south down the road, I pass through the town of Shingbuiyang (pronounced Shin-bwe-YANG) at mile 109 along the road from Ledo. In 1943 Shingbuiyang, Stilwell’s forward base in Burma, was a village with a few hundred inhabitants. What I see today is a shanty settlement of some 30,000 people, most of whom have come to sluice-mine the rich gold deposits recently discovered nearby.

From Shingbuiyang the road heads south, negotiating the flat Hukawng and Mogaung Valleys along an efficient track as straight as a taut string. On either side hulking mountain ranges hem in rice fields, which in November stand golden and ready for harvest. Elephants drag logs and roof beams up and down the road’s patchy gravel, and water buffalo wallow in the mud of roadside ditches, their swept-back horns and rounded brown bodies looking like something bolted together in Detroit.

Like me, the southbound traffic in World War II was headed for the Ayeyarwady (Irrawaddy) River port of Myitkyina (Mit-chee-NAH) 180 miles south of Shingbuiyang. At Myitkyina, from May to August 1944, Chinese and U.S. forces under Stilwell engaged 3,500 Japanese defenders. Before the siege was over, 790 Japanese were killed and 1,180 wounded, while the Allies suffered 1,244 dead with 4,139 wounded.

Today Myitkyina is a busy port overlooking the glassy, broad Ayeyarwady. The city has a raucous market where fish, meats, leg-hold traps

for tigers, fruits, teas, vegetables, fishing nets, and piles of red, green, and orange spices sprawl over three blocks. Scattered across town—and on the forested mountainsides overlooking the city—sit dozens of exquisitely crafted pagodas, their white-painted brick walls and bulbous gilded roofs glittering in the sun. Thanks to a 1994 ceasefire by the Kachin people, who warred for years for local self-rule, tourism reopened a few years ago in Myitkyina, though most of the outlying countryside is still off-limits to visitors.

It's easy to understand why outsiders are drawn here. The Kachin, who love to eat and

were destroyed in 2002. Indeed, two days later I watch on TV as officials burn hundreds of pounds of opium and heroin set out on tables for public display.

Like the current plan to reopen the Ledo Road between Myanmar and India (jump-starting trade between the two nations), drug eradication is another way Myanmar is trying to reconnect with countries beyond its borders.

"After a long period of ignoring the larger world," my official acquaintance tells me, "the government is starting to engage its neighbors again. The time of Myanmar's political

You can buy anything—opium, weapons, or women.

dance and celebrate, are friendly and accommodating people—provided you don't cross them. During World War II their ambush skills and ferocity (they cut the ears from Japanese dead as trophies) assured that the Kachin lands of the north remained the country's only unoccupied region. As my Kachin

friend, former jungle fighter turned leader Ah-Gu-Di, says, "We Kachin love progress. We love visitors. I welcome the world to visit Myitkyina. Just don't bring an occupying army, or we'll be forced to defend ourselves."

Myitkyina is also the focal point for two of Myanmar's greatest cash generators: jade and opium. Near Hpakan, northwest of the city, huge deposits of translucent green jadeite—one of the world's rarest gemstones—are excavated by thousands of workers. Even more valuable are the riches southeast of Myitkyina, in the lands of the Shan and Wa peoples, who cultivate *Papaver somniferum*, the opium poppy.

Yet on this visit to Myitkyina, I rarely see the purple-black squares or white balls of opium I witnessed on previous trips. When I ask a government official about the change, he says that Myanmar has embarked on a program to stamp out opium. According to the government, 8,500 pounds of opium and 645 pounds of heroin

WARTIME memories bring tears to Zhang Zhujun, who was 24 when she fled her village to escape the Japanese. Returning months later, she disguised herself as an old woman to avoid being raped by Japanese soldiers.



isolation, I think, is coming to an end."

But like the road's story, my story hardly ends at Myitkyina. Tracking south from town, the road jumps the Ayeyarwady by bridge, then continues to the smaller, yet equally restful, Ayeyarwady port of Bhamo. Along the way I find myself in the lands of the Shan. A standoffish people, the Shan have long claimed independence from the rest of Myanmar (calling their territory Tai-Land), and they possess a guerrilla army perhaps 10,000 strong—its weapons allegedly bought by drug money—to enforce their beliefs. Consequently, travel inside Shan country is circumscribed, and I must keep strictly to the road. Heavily defended Myanmar army checkpoints loom at river crossings and crossroads. I find the tension and constant roadblocks exhausting.

South of Bhamo even the road surrenders. As it begins snaking east across rugged mountains near the border with China, it degenerates to

potholed mud and cobblestones. Army checkpoints are even more frequent. I'm not sorry when, two days and 200 miles southeast of Myitkyina, I top one last rain forest ridge and see the mountains of China in the distance.

No matter how you enter modern China, it's always a shock. Whether you fly in through Hong Kong or Shanghai, or come in by road or rail, once inside you can't help but experience China's vitality through a condition the Chinese

redoubt. But by September 1944 the Chinese had reached the top, and after nearly a month of fighting, the Japanese were finally bludgeoned and blasted into defeat. When it was over, at one battle site alone, 62 pairs of Chinese and Japanese soldiers would be found dead in each other's grasp. Overall the Chinese lost 7,675 men, and the Japanese roughly 1,300.

On this December morning, as I walk the pine-covered mountain, examining the war trenches, what I find is not the horror of death but hundreds of schoolkids. They're from the nearby village of Dayakou, and they're

“I know it's famous, [but] I say: Take the new highway,

refer to as *renao*, meaning “hot and noisy.”

Crossing from Myanmar to China above the wide Shweli River, I feel *renao*'s zing as soon as I reach the other side: honking cars and trucks and constantly beeping cell phones. My first stop, the city of Ruili, is full of neon lights, skyscraper hotels, and audio speakers blaring pop music from storefronts. I have a sense that, were I to ask, I could buy anything along its streets—from opium to weapons. Prostitutes cruise the restaurants and bars; magically, it seems, they discover where I'm staying and telephone my hotel room at night, even knock on my door.

After two days in Ruili, it's a relief to head on up the Burma Road, advancing deeper into southwestern China just as the Japanese did in World War II. (Ironically, after the fall of Burma in 1942, Japan used the Burma Road as its own artery of invasion.) The road is fast and the hired cars new; scenery hurtles past. Soon after Ruili I climb the first of several mountains and pass through the town of Wanding, close to where in 1945 the Ledo Road met the Burma Road. Then the road begins a long climb onto a windy plateau. Everywhere mountains spike into blue sky, with rice growing in tiered steps that climb endlessly toward each summit.

When I reach the west bank of the raging Salween River, I confront one of the most imposing mountains I've ever seen: Songshan (Pine Mountain), also known as the eastern Gibraltar. In World War II, with 26 miles of ridgeline and thousands of armed Japanese entrenched along its summit, not to mention the boiling river at its base thousands of feet below, Songshan must have glowered like an impossible

practicing a parade march for a local holiday the next day. As they drill, with their bright red Chinese flags flapping, their drums pounding and cymbals bashing, I turn and take in Songshan's enormous vistas. The road is still here, the mountain is still here, and because of the blood spilled over both, the Chinese children of Dayakou are safe to rehearse a clanging, ebullient, dust-raising parade beneath the warm sun.

Two hours beyond Songshan the Burma Road converges on its modern counterpart: a new, six-lane highway connecting Ruili and Kunming. While the two-lane cobblestone road I'm on clings to the mountain flanks, the new road streaks down the valley floor below. My driver, mindful of getting home to Ruili, suggests the faster option, which can put us in Kunming in four or five hours. No, I reply; we'll keep to the old road all the way from India to Kunming.

At a spot where tiered paddies seem to be stepping toward a naked pink-granite mountaintop in the distance, I meet an aged goat-herd in a blue Chairman Mao coat, driving his animals home in the afternoon, all the while smoking an endless succession of cigarettes. He is wrinkled, has matted hair, and wears broken, unlaced shoes. His name is Lu Shaocang, and he is 75 years old. After introductions he says, “I built this stretch of the road, right here.”

In fact Lu helped build the next six miles of the road in less than two years. “It was not easy. I was a boy. In 1937 the engineers came through with stakes, marking where they wanted the roadway.” Lu pauses and puffs on his cigarette. “We worked seven days a week, from sunrise to

sunset. Then the Japanese came up the road from Burma. They asked: 'Are you a farmer, a laborer, or a rifleman?' If you said you were a rifleman, as three men in my village did, the Japanese shot you."

Lu had heard that in the cities the Japanese raped Chinese women and killed civilians. "But I did not see that. I cooked for them and did labor. They weren't too bad. They didn't beat me. They even paid me, which is more than I got for almost two years of roadbuilding."

Below us, trucks carrying goods cruise the new road. The commerce of modern China fills the

skyscrapers. Just across the busy street from the gate, crowds are entering one of several department stores that ring an open traffic circle. I stare at the West Gate again, remembering the road's other end, with its patchy mud and asphalt, all the way back in India.

Sunset is coming. Across the street neon-lit Kentucky Fried Chicken and McDonald's franchises are at war for modern China's waistline and pocketbook. Who recalls what stood in those spots in 1945, long before this newest invasion?

Then I have to chuckle: Even the West Gate itself is new. The original was destroyed in 1966,

and leave this road to the goats and to the past."

valley floor. And yet here on the old road I'm standing with a goatherd, surrounded by livestock, with only my car in sight.

How does Lu feel about the Burma Road?

"I know it's famous," he says. "I know it's a part of history. But it's now forgotten. To me, I use it, but I can't eat it. And, really, it has too many turns. I say:

Take the new highway, and leave this road to the goats and to the past."

Even as I finish my journey along the Burma Road, even as I consign it to my own past, I don't want the road to be forgotten. But after leaving Lu, I pass through the cities of Baoshan and Xiaguan, where I can find almost nothing from the war, other than the memories of a few elderly people. For that matter there's not even very much I recognize from my first trip here just two years ago. The new China is going up as fast as the concrete can dry, white-tiled skyscrapers all but replacing the old single-story structures with their upswept eaves and red-tiled roofs.

Late one afternoon I find myself standing at the West Gate to the city of Kunming, its red enameled timbers rising from the city park. All around me the citizens of today's China, wearing loafers and Levis and windbreakers, their mobile phones abuzz, hustle along beneath

DRAGOONED

by Chinese troops at age ten, Lu Shaocang labored on a road gang for nearly two years without pay. The Japanese later forced him to work as a cook, he says, but they never beat him—and even offered him a wage.



during China's Cultural Revolution, when all symbols of an exploitative past were expunged by loyalists of Chairman Mao. The people of modern Kunming rebuilt their West Gate in 1999. But standing here, in front of the rebuilt gate, I know that even time and landslides and cultural revolutions haven't been able to extinguish the road.

Despite what the old soldiers and goatherds advise, the road is alive, moving people and animals and all manner of things over more than a thousand miles. Its track may be ignored by a world that has moved on, but still the road is there. Which brings me back to the U.S. veteran Mitchell Opas and his finger-pointing directive: "If that road's still there, send pictures of it."

You got it, Mitch.

WEBSITE EXCLUSIVE

Go behind the scenes with Donovan Webster and Maria Stenzel, see more images, and find related websites and resources: nationalgeographic.com/ngm/0311.



SLOW BOAT through Burma carries one vehicle at a time across the Tawang River; the bridge built by the Allies is long gone. A local gold rush has inflated the fare to a pricey \$15. An oxcart provides cheaper transport for a farmer (below) plodding through the Mogaung Valley. Monsoons slow traffic further, obliterating a bridge near Nanyung (right) as if it were made of matchsticks.

For the past hundred miles I've watched the road go from pavement to gravel to mud to its current state, a footpath through enclosing jungle.







After decades of political isolation, Myanmar is trying to reconnect with countries beyond its borders.

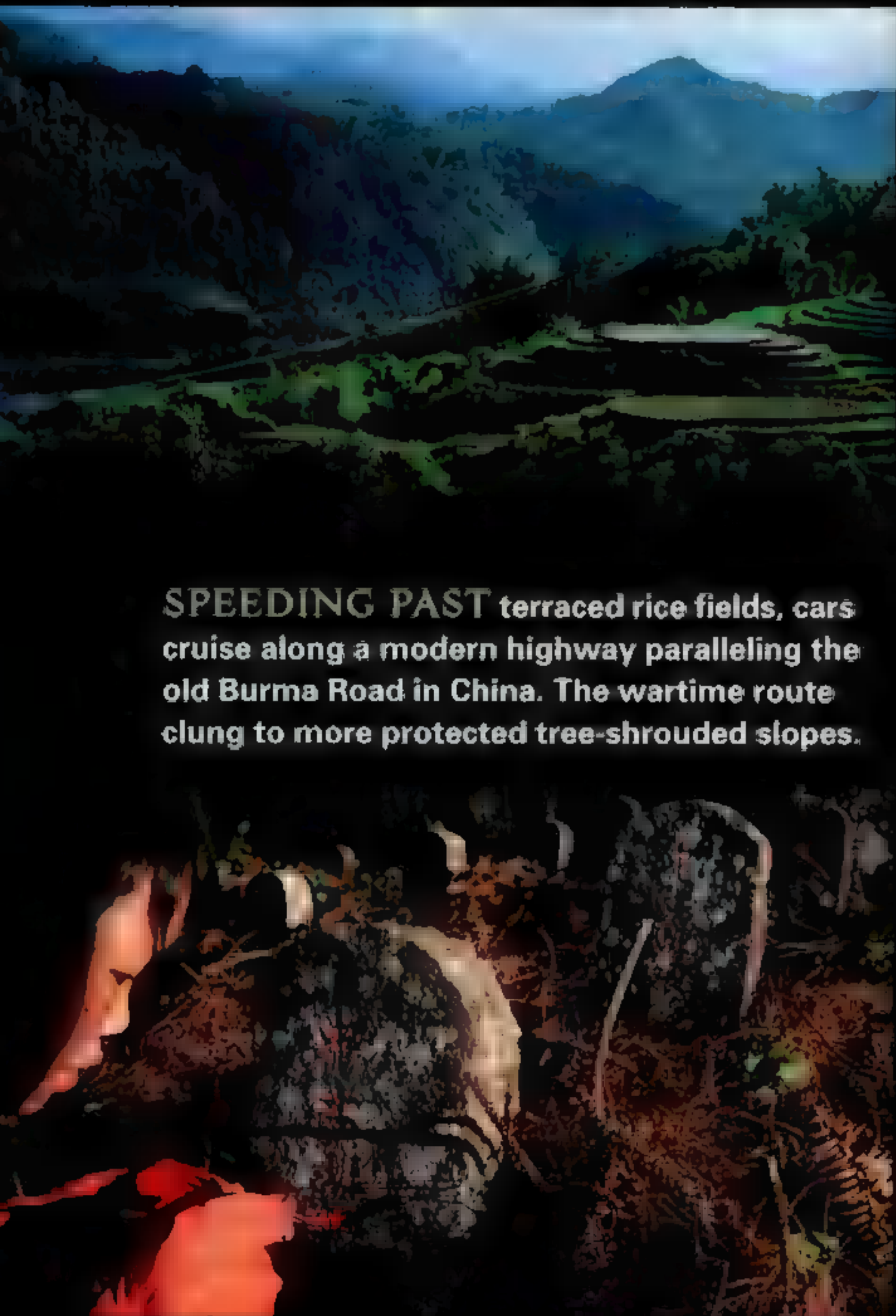


NEW DAY brings morning light to bathe a roadside food stall in the gold-mining town of Shingbwiyang. Despite rich natural resources, Myanmar remains impoverished and repressed, the result of military regimes that have ruled the nation for 40 years.



NATIONAL ARCHIVES

A TRIUMPHANT General Pick waves to the crowd as he leads a convoy into Kunming in February 1945, completing the first trip along the entire 1,100 miles of the Burma Road.



SPEEDING PAST terraced rice fields, cars cruise along a modern highway paralleling the old Burma Road in China. The wartime route clung to more protected tree-shrouded slopes.

HONORING THE FALLEN, Liu Conglian repaints names on headstones at the Guo Shang Cemetery in Tengchong, China. In a harrowing standoff between May and September 1944, more than 9,000 Chinese and 2,000 Japanese were killed here.





END OF THE ROAD is marked by the rebuilt West Gate of Kunming, a town transformed by war. Entire factories were moved here to escape capture by the Japanese, fostering one of southwestern China's most vibrant cities. □

AMERICAN LANDSCAPES

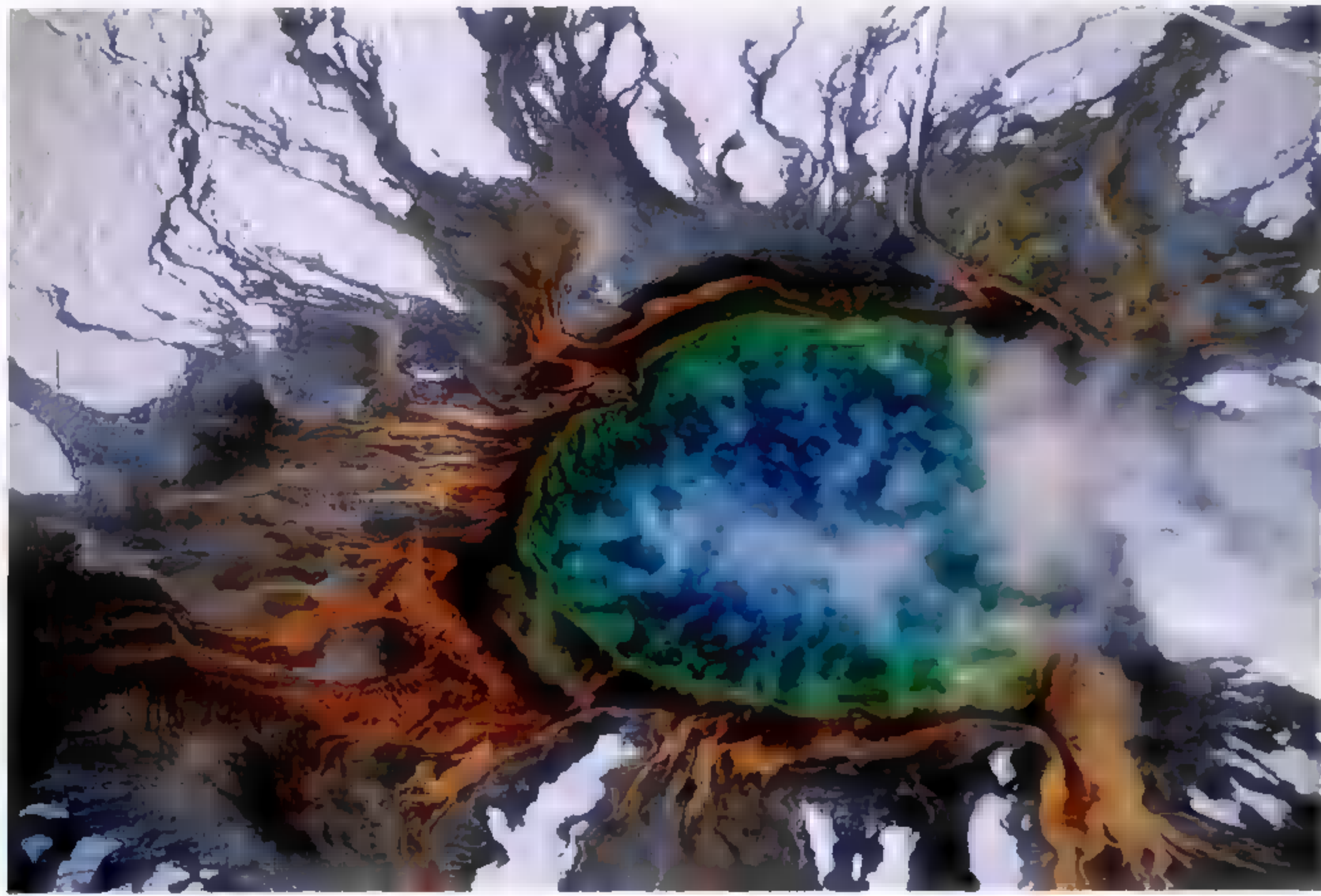


YELLOWSTONE
& GRAND TETON NATIONAL PARKS



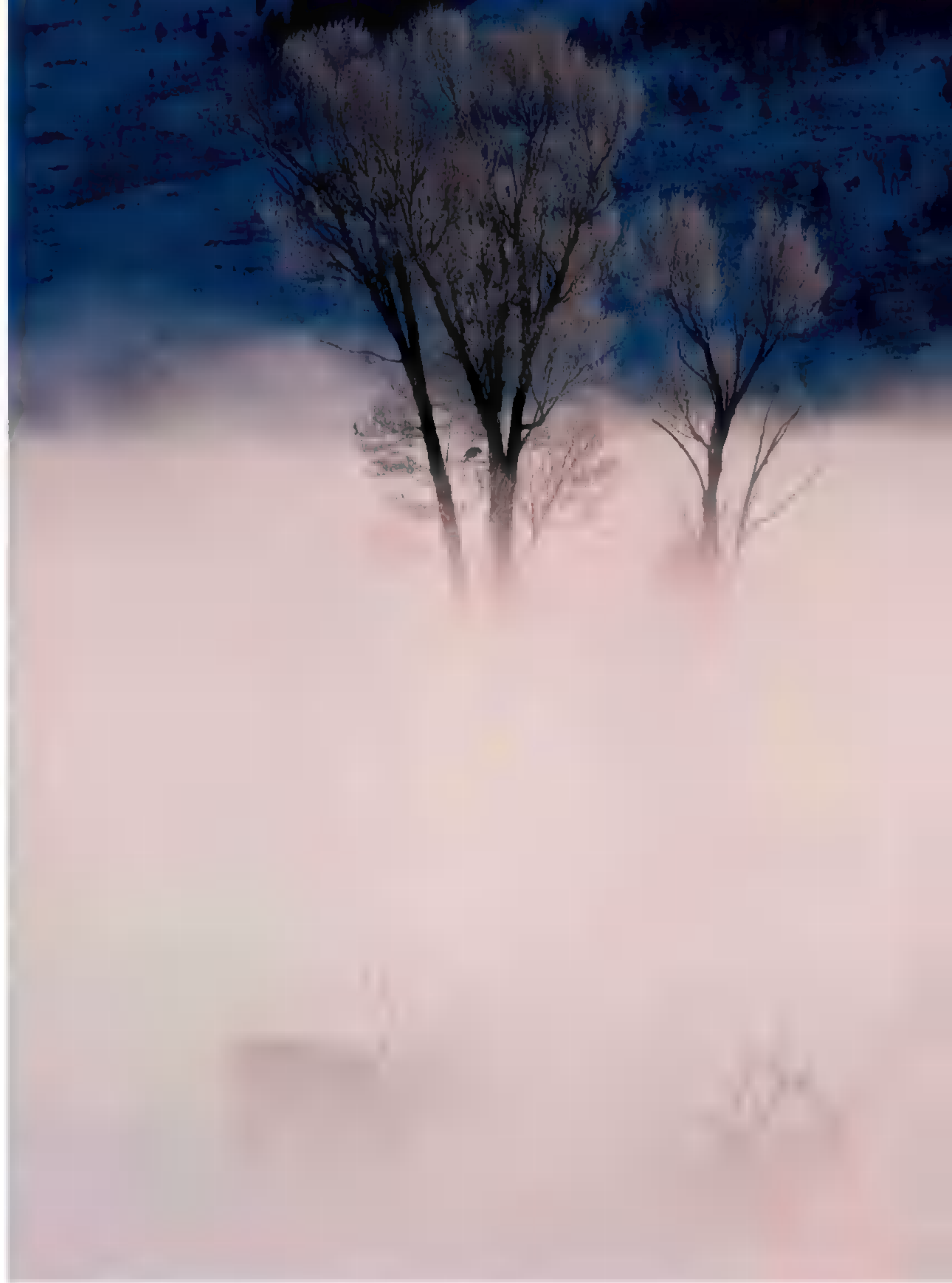
HENRY H. HOLDSWORTH

IN SUBZERO SOLITUDE *the Tetons pierce a winter dawn. Gold standard of parks, Grand Teton and Yellowstone form the core of a natural system defined by the needs of wildlife—and by nature's glory.*



JIM BRANDENBURG, MINDEN PICTURES

Gifts without Measure





HENRY H. HOLDSWORTH

MIST OBSCURES bull elk grazing in the National Elk Refuge south of Grand Teton park in Wyoming. Farther north, algae and other microbes, tolerant of volcanic heat, paint rings of green and yellow around Yellowstone's Grand Prismatic Spring (left).



OTHERWORLDLY ICE



MICHAEL QUINTON, MINDEN PICTURES

Born of frozen thermal steam, a frosty fairyland glazes the world of Mammoth Hot Springs. Deposits of a white mineral, travertine, were created by Yellowstone's volcanic plumbing—a hot spot active for two million years. That heat feeds some 300 geysers, the greatest concentration on Earth.



MARC MUENCH (ABOVE); HENRY B. HOLDSWORTH

NATURE'S FURNACE

Steamy Silex Spring in Yellowstone's Lower Geyser Basin evokes a primeval scene. Nearby, the Firehole River weaves through a dream landscape toward Old Faithful (right), which performs its clockwork magic beneath a veiled sun.



From my cabin window in Teton Valley, Idaho, real life looks like this: There is a snow-covered meadow, and beyond that a stand of bare gray aspen trees, and beyond that a spill of sun-stunned white until the Earth rears back on itself and makes the Rocky Mountains. It is a landscape that has

inspired an unprecedented act of Congress and a great many acts of poetry, but I measure it by its ordinary day-to-day gifts.

Today, for instance, in early March, it is far from warm—the slipping hold of winter is still evident—and my horses hunch their shoulders to the wind, their tails swinging under their bellies. But when I take hay out to the snow-buried meadow for them, a great blue heron (the first I have seen this season) startles at my approach, lumbers into the air, and careers into an icy headwind. It evokes a drunk pterodactyl. And that is gift number one.

At noon Wyoming Public Radio warns listeners that bears are coming out of hibernation and that we should beware of the hungry animals on the prowl for food. And flies, giddy with the promise of longer days, seep out of the logs of my cabin and fall in exhausted layers on the windowsills or buzz weakly over my cup before sinking to their death-by-tea. Life, in all its dangerous, complicated, annoying glory, has returned to this corner of the sun-tilted world. And that is gift number two.

Then at sundown the earth is starting to emit the sour breath of winter, which is six months' worth of accumulated manure and rotting grass, and the diminished carcass of the coyote that died under a willow bush four feet from the

frozen pond in a snowdrift in January and has been picked over by magpies ever since. There is the chaos of winter debris in my yard, and out across the horses' paddock as far as I can smell, there is the life-affirming stench of renewal. And that is gift without measure.

We are being released from the deserting grip of winter. From late September until just the other day, it felt as if it were only me out here. Me and the coyotes, the black bull moose with the Elvis curl to his lip, the two bald eagles and their offspring, the ten trumpeter swans. I counted these creatures with fierce, almost possessive regularity, as if my own life depended on their surviving until the spring. But two months from now (as March and April melt into May) until the frost comes again, the casual observer could be forgiven for supposing that life is recklessly generated in these mountains.

For in the summer this area seethes with wildlife. Animals spill with exuberant abandon onto land we humans think of as private and that deer and elk think of as forage. The greatest concentrations of animals spend their summers in the protected confines of the proximate national parks—Yellowstone and Grand Teton—which, in their turn, give a teasing impression of plenty. There are very few places



HENRY H. HOLDSWORTH

LIQUID HEAT warms freshly powdered bison, a handful of the nearly 5,000 that range between Yellowstone and Grand Teton. Gray wolves—successfully and controversially reintroduced in the 1990s—now also roam this vast wildlife corridor, occasionally preying on elk, livestock, even bison.

left in North America, less than a handful, that still contain the number of species that existed when Europeans first explored and settled the continent. This is one of them. John Colter (of the Lewis and Clark expedition) walked through this region in 1807. Nearly 200 years later, almost every species of animal life that he could have seen can still be seen today. Within Grand Teton alone there are, in the fat months of summer, 18 species of carnivores (including wolverines, wolves, and black and grizzly bears), 7 native species of hoofed mammals, 22 species of rodents, 6 of bats, 5 of amphibians, 16 of fish,

more than 300 species of birds, 900 species of flowering plants, and 7 species of conifers.

BUT THIS COUNTRY IS SLICED INTO TWO worlds. The brittle paucity of winter is one world; the careless glut of summer is the other. The bridge between the two worlds is a series of ever diminishing migration routes that take the animals and birds by earth and air from summer in and around Yellowstone and Grand Teton National Parks to winter lands near and wide. As Jackson-based biologist Franz Camenzind told me, "If you look at where some of Yellowstone

and Teton's widest ranging species go—there are Swainson's hawks and hummingbirds that go all the way to Central and South America—you could argue that the influence of those two parks extends beyond our national borders. This is a very impressive reservoir of animals we have here, but they couldn't survive if they were limited to the parks' boundaries."

A capricious act of God, or an act of supreme human carelessness, could quite easily remove the forces of life from this landscape. Even so, even without its wildlife, the hard, inorganic matter that remains would still make for ravishing visions because this landscape aches with a beauty that is young and correspondingly restless. So startled and inspired were our forefathers by this picturesque range of geography that they took the novel step, in 1872, of declaring in an act of Congress that Yellowstone be set aside as the world's first national park, "for the benefit and enjoyment of the people." In 1950 Grand Teton National Park, as we know it today, was created, a 310,000-acre tract of managed wildlands that runs along the spine of the Rocky Mountains and into the valley of Jackson Hole.

Together, these two national parks (linked by the John D. Rockefeller, Jr., Memorial Parkway) constitute over 2.5 million acres, each acre tumbling upon itself to rival the last acre of beauty.



JOSE AZEL

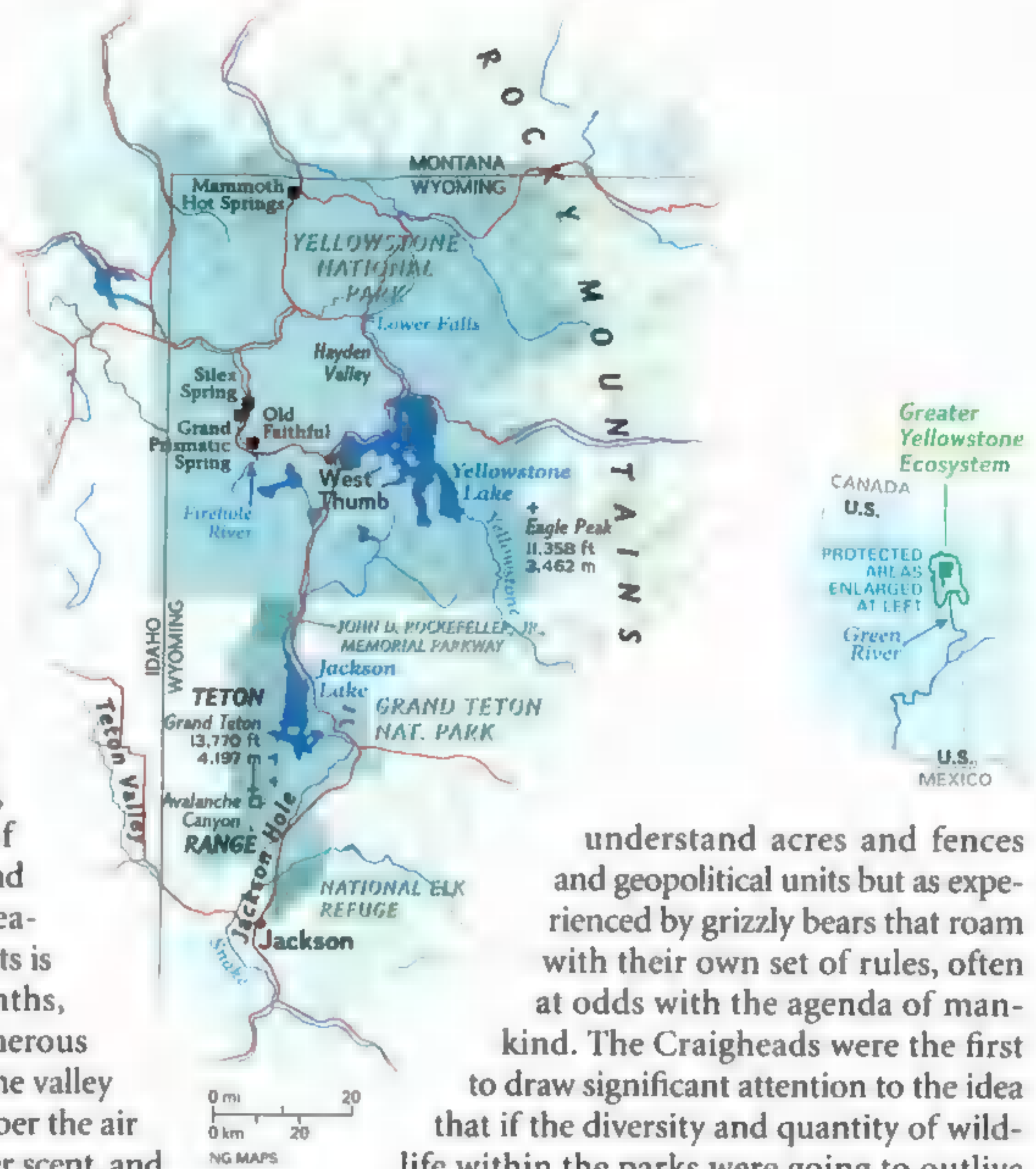
PAVED IN SNOW, winter byways now allow up to 1,140 snowmobilers a day to enjoy—critics say destroy—Yellowstone and Grand Teton. These parks are the heart of the Greater Yellowstone Ecosystem (map), an 18-million-acre swath of vital habitat.

Within a space that can be covered on my map by the tip of one finger, forests, mountain ranges, geysers, mud pots, and river valleys congregate in a surfeit of scenery. It is as if the vertigo-inducing flats of the American Midwest toppled to a halt right here and made up for the relatively bland expanse of the prairies with more than ordinary remorse.

Here is how this uneasy scenery was born: About 13 million years ago there was a time of great violence, and a series of immense earthquakes, separated by pauses

of about two thousand years, ripped along a fault found where the Teton Range now meets the valley floor. By 12,000 years ago glaciers had carved canyons through the resulting uplift and created a sequence of stark, steep-flanked peaks, the tallest of which, the Grand Teton, surges well over a mile above the sagebrush flats into the sky. Conceived in even greater violence, Yellowstone's central plateau was born in a succession of massive volcanic eruptions, the last of which occurred some 600,000 years ago.

It is beautiful. But no one could accuse it of being kind. The ground here is inhospitable, and not just around Yellowstone's geysers, where the crusty earth evokes the hostile and sulfurous cauldrons of Hades. Even grassy meadows are, on closer inspection, sewn onto a fragile scuff of the planet's surface. Soils created by volcanic



activity in Yellowstone's higher elevations tend toward parched austerity, and the rocky slopes of Grand Teton are severe and exposed. The growing season in the subalpine forests is stingy—about two months, extending to a hardly generous three or four months in the valley bottoms. By mid-September the air takes on a deadened, bitter scent, and a settling silence mantles the earth. Yet pressed out by the greater stretches of human development that have devoured their habitat, wildlife has found a home in these unfavorable climes. And it is the wildlife that continually reinvents the scenery: grazing and nesting, birthing and hunting, giving its canyons and meadows subtly new forms. Pull tightly enough on the thread of one creature's habits, and a whole ecosystem can pitch down on top of you. It is as John Muir said, "When we try to pick out anything by itself, we find it hitched to everything else in the universe."

GRAND TETON AND YELLOWSTONE'S boundaries were originally determined by the extent of their scenic values, but it was not until the last half of the past century that anyone thought to try to define the boundaries of the parks not in terms of absolute square miles but in terms of the range taken by the wildlife that use the parks and for which the parks are increasingly important. In the 1970s two biologists, John and Frank Craighead, determined to comprehend Yellowstone and Grand Teton National Parks not as explained by humans who

understand acres and fences and geopolitical units but as experienced by grizzly bears that roam with their own set of rules, often at odds with the agenda of mankind. The Craigheads were the first to draw significant attention to the idea that if the diversity and quantity of wildlife within the parks were going to outlive the century, then it was not enough to draw a line around a selection of animals and their summer range, as if they were immobile scenery, and call it protected. The survival strategies of the wildlife and the systems on which they depend (migration and access to winter ranges, for example) have to be managed too.

If Yellowstone and Grand Teton were going to continue to host not only grizzly bears (those great symbols of freedom and bad temper) but also pronghorn (whose yearly journey from Grand Teton to the Upper Green River Valley is the longest overland mammal migration between the Canadian border and Tierra del Fuego), then there would have to be porous park borders. There would have to be a stain of lands beyond the limits of the national parks in which bears could roam and into which pronghorn could pass the thin, cold months of winter.

The all-important bridge between the worlds of winter and summer consists, largely, of public land beyond the parks' borders and has been dubbed the Greater Yellowstone Ecosystem (GYE). Anyone intimate with the ecosystem accepts that its boundaries are more or less arbitrary. For instance you might argue, based on



ROCK AFLAME AT DAWN



JOSE AZEL

Muscular peaks like these near Avalanche Canyon inspired a fur trapper in 1820 to call the Tetons "the most remarkable heights in . . . the great backbone of America." Uplifting of the range began 13 million years ago; glaciers later chiseled and scooped its daunting spires and canyons.

migrating hummingbirds, that the GYE should extend down to Central and South America. But that's not a practical chunk of land to bite off. Franz Camenzind, the Jackson biologist, told me, "In the end, for sanity's sake, you have to draw a line in the forest and call it an ecosystem."

No longer defined just by the range needed to accommodate the grouchy travels of *Ursus arctos horribilis*, the GYE as a concept has expanded to also include (for instance) intact watersheds and mountain ranges. This spread of approximately 18 million acres now swallows, in addition to the two national parks, more than a dozen towns, all or most of seven national forests, three national wildlife refuges, more than twenty other state and local jurisdictions, as well as numerous ranches, roads, and oil and natural gas fields in Idaho, Wyoming, and Montana. Grand Teton and Yellowstone National Parks are at the heart of the GYE, and the GYE is the body supported by the parks. Without one or the other, the wildlife would cease to exist, and both would be reduced to a state of life-starved scenery.

FROM MY CABIN I CAN DRIVE ACROSS the GYE in any direction in a day. "The GYE," said Camenzind, "is the largest relatively intact ecosystem in the lower forty-eight, but when you look at it on a map, or fly over it, it's tiny. It's the largest we have, but it's not large."

Because of its reduced scale, we humans who attempt to manage the GYE's survival need to pay attention not just to the celebrity species (grizzlies, wolves, bison) but to the quieter processes that speak of the wildlife's ability to survive the caprices of our desires. We have to

try to put ourselves in the hooves of the animals we want to live with.

Joel Berger is lean and weather-washed and unassuming, a man whose mind is bilingual between the human world and the world of animals. For the past nine years he has endured charging moose, surprised bears, the hostile breath of Rocky Mountain winters, and long trudges through leg-grasping sagebrush in pursuit of freshly delivered moose droppings. As a biologist with the Wildlife Conservation Society, he has been studying what effect, if any, the recent reintroduction of wolves into the GYE is having on the resident moose population, which had not known wolves for generations. Berger has analyzed the fertility of moose cows (hormones present in droppings indicate pregnancy rates) and the subsequent calf survival rate and has tested moose reaction to recorded wolf calls as well as other natural sounds. This has led him to conclude that a recent drop in the moose population is due not to the presence of wolves, as was commonly supposed, but to the drought that has desiccated the area for the past four years. In these lean times fewer cows conceive, and fewer calves survive the crucial crunch of summer before the deadening of winter.

The day after winter solstice, Berger and I set out walking across the sagebrush flats at the south end of Grand Teton National Park. A collared cow moose was lying with four males and one other female in the pale green scrub. When we were almost upon her, Berger suddenly cupped his hands and called like a raven. The cow moose didn't flinch. Then he howled like a wolf. The cow moose looked bored.

WEBSITE EXCLUSIVE

Paint your desktop with Yellowstone's colors and send a Grand Teton e-greeting. Find photographer's tips and more photos at nationalgeographic.com/ngm/0311.



HENRY H. HOLDSWORTH

A PHALANX OF SILVERED ASPENS *endures winter's long march in Grand Teton. For humans the trees offer visual solace. For wildlife they serve as both larder and shelter: Elk, deer, and moose feed on the bark and branches, while beavers gnaw what they need to build dams and lodges.*

"When they've had calves taken by wolves, they respond to that call," Berger said. "It doesn't take them long to learn that lesson when it's directly affected them. But they don't seem to have an ancestral memory of wolf predation." The moose delivered her sample, and Berger carefully scooped it into a Ziploc bag, keeping a wary eye on the cow herself, who had moved casually off toward one of the males, just beyond kicking distance. We trudged back to the road, turning our backs on the wintering moose. "I've been doing this all my working life because I'm curious what impact we have on the natural world." He smiled

into the pale winter sun. "But what's almost as curious—and perhaps harder to quantify—is the impact the natural world has on us."

I think I know. How lonely it would be to stare down a long winter—however rewarding the scenery—without the predictable companionship of moose, coyotes, magpies, swans. How disheartening to miss the prospect of a noisy spring as heralded by the raucous trilling of a red-winged blackbird, the shy pulsing of a hummingbird at the sugar feeder, the startling rush of ducks off the rivers, or the uncurling of a spindly elk fawn from behind a fallen aspen.



JOSE AZEL (ABOVE); TOM MURPHY

WHEN SILENCE REIGNS

A wary coyote steals through drifts in Hayden Valley, rendered featureless by deep snow. To the north ice mutes the roar of the Yellowstone River's Lower Falls, at 308 feet the steepest dip along the river's undammed course. Such are the gifts of winter, when these parkland jewels can gleam in peace. □



ZipUSA

FARGO NORTH DAKOTA





58102

The Fargo that Wasn't in the Movie

BY DAVID BEERS

PHOTOGRAPHS BY HENK BERNIS

Facing minus 10°F, Meredith Meyer trudges to work in a home-made snorkel hood—as quirky as the Oscar-winning film that made her town famous. People look twice, she says, but only out of jealousy. In Fargo, ingenuity is as plentiful as snow.



Tami Smith has already made history. She's the first woman ever to head up the annual Kiwanis Club Pancake Carnival in Fargo, North Dakota. Now she's hoping the 45th Carnival will break all records. To do so would mean feeding breakfast to 11,000 people on a single Saturday in February, a feat approachable only if Smith's dozens of volunteers flip, fry, serve, and swipe clean with crack precision.

The charity event is such a Fargo tradition that it's a coveted civic honor to be anointed a pancake flipper. (When one Carnival stalwart died, his wife requested that pancakes be flipped at his funeral. And so they were.)

Smith and her team attend to the final details at the Fargo Civic Center the day before the Carnival. Ten thousand cartons of milk. Check. Twelve thousand plastic bottles of syrup. Check. Griddle number two, a round one that rotates, is down, but Dave Duff, product manager for a local tractor company, is sure he can fix the broken bearing. Jerry Hartford, a mechanical engineer, unfolds his new blueprint for efficiently routing long lines of the hungry.

Eleven thousand cartons of orange juice. Check.

Seven years ago Smith, who is 31 and sells promotional products, was dismayed to learn her employer was transferring her to Fargo. "I told them if they didn't move me again in six months, I'd quit." She flashes a smile, resting busy hands for a moment on her fulsomely pregnant stomach. "I soon found myself loving it here."

It is no small thing to profess one's love of Fargo in the dead of winter. Even in November there are days when it is colder here than at the North Pole, days when snow might not fall but prairie winds whip up snow already on the ground (and a fair amount of dirt) to cause a blinding horizontal blizzard.

If you saw the movie *Fargo*, you remember the impossibly flat whiteness. But what you don't remember is Fargo itself, for not a frame was shot here. And so you may not know that Fargo is a city of 91,000 people with another 33,000 just across the Red River in Moorhead, Minnesota. Or that freight trains rumble and moan



58102

POPULATION: 31,932

MEDIAN AGE: 29.4

MURDERS IN THE PAST FIVE YEARS: 3 (2 solved)

TANNING SALONS: 4

LOWEST TEMPERATURE: -39°F

AVERAGE ANNUAL

SNOWFALL: 40 inches

CITY SNOWPLOWS: 20

Robust winter winds sweep a sideways blizzard across the plains (above). Weeks after doing some sweeping of her own, Ruth Urang (below) suffered a stroke. Says Ruth, who doesn't smoke or drink: "So much for clean living."



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FARGO, NORTH DAKOTA

through the low-slung downtown day and night. Or that within one zip code, 58102, there is a medical center that broadcasts robotic surgeries, a historic Broadway being restored to former glory, and a library where young refugees from Bosnia, Sudan, and Somalia crowd around computer screens, catching up on news from home.

What *Fargo* did get right is the friendly tenacity of Fargoans, says Kristin Rudrüd, an actress who played the kidnapped wife in the film and who lives here with her ten-year-old daughter. “That spirit of pressing on, one foot in front of the other, with a good heart,” is how Fargoans get through their winters, she says. “People seem to obey the Scandinavian concept of *janteloven*. It means, basically, ‘Don’t show off.’”

When *Fargo* captivated moviegoers with its “Ya! You betcha!” heartland stereotypes in 1996, Fargo responded with an ironic wink. Residents wore their goofiest ear-flapped caps for an Academy Awards gala held downtown at the Fargo Theatre. The national news media arrived to get in on the joke. But Margie Bailly, who runs the 1926 art deco theater, had the last laugh. Drawing all that attention to her faded gem of a movie palace attracted more funding to restore it.

Weeks later, as a particularly nasty winter melted into a flood, the news media was back. With friendly tenacity and no showing off, Fargoans filled and set 3.5 million sandbags to defy the swollen Red River. Dennis Walaker, the bear-size director of Fargo Public Works, emerged as a local hero.

Fargoans do not coddle their heroes. When 80-year-old Ruth Urang catches sight of Walaker on the street, she lets him have it: “Tell your road crews to stop tossing these economy-size hunks of ice on my walk.” Only after Walaker promises, and is out of earshot, does Urang say, “He saved the city. If it weren’t for him, we’d all be nine feet under.”

Urang, who has just returned from a friend’s funeral, is attacking the snow in front of her crisply modest home with a fresh yellow-bristled broom. She wears a light coat and skirt. Her shins are bared to the 20-below windchill.

No, you don’t let a little threat of frostbite cramp your style in Fargo. So on an average way-below-zero morning, you may spy Ronald Davenport cycling to his bank job, his face mask collecting a crust of ice crystals. At noon bundled-up Matt Halverson casually barbecues bratwurst outside Metro Drug at Second and Broadway. After dinner Hannah Berg, 7, braves the icy wind to arrive at Horace Mann Elementary School’s outdoor rink. The other kids, all older, blindfold her so she can kneel on the ice and sort their hockey sticks to decide teams for a pickup game. And in the coldest late hours, two nearly naked souls stand on a fire escape, steam billowing off them. They have just emerged from the sauna at the



Hungry hordes flock ■ the annual Kiwanis Club Pancake Carnival—a 45-year tradition that now draws more than 10,000 people to the Fargo Civic Center. Eager eaters line up before the doors open at 7 a.m. Tami Smith, chairperson of the breakfast, likens it ■ “cattle moving.” This year a faulty griddle caused a near catastrophe, but the crew just improvised, and the show went on.

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FARGO, NORTH DAKOTA

Spirit Room gallery and yoga studio. They place blocks of wood under their feet to keep from sticking to the freezing metal.

On the morning of the Pancake Karnival, the griddle action is intense. "My eyelashes are melted together," says LeAnn Koehler, a first-time flipper. "Next time I won't wear mascara." Two griddles down Alex Sahr shares the wisdom of his 85 years. "When it gets dry around the edges, flip it. But don't flip it too high."

Right. Might be a violation of janteloven.

Tami Smith, wearing a headset to command her troops, takes a cell phone call from a fellow Kiwanian lying on a beach somewhere in the Caribbean. "The sausage fryer keeps blowing fuses," she tells him. "Otherwise, we're doing pretty good."

More janteloven, actually. Tami and her Karnival crew will break the record they care about most, raising more than \$30,000 for charity, their highest amount ever, while serving a near record 10,737 attendees.

Out there among the breakfasting throng bobs a lonely Mohawk haircut of blue and yellow spikes. It belongs to Jake Boucher, 15, who, having downed his last flapjack, is eager to leave this Karnival for another carnival.

That would be the city's first Winter Carnival, featuring punk rock and homegrown avant-garde. Eighteen bands play for no pay at the Fargo Theatre. At one point local drag queens appear on stage to lip-synch tunes by Cher and other divas.

And just after midnight, at show's end, the mighty Wurlitzer pipe organ rises from its pit. The man at the four banks of keys is the furthest thing from the shrieking headbangers who just preceded him onstage. But silver-haired Dave Knudtson, employed here at the theater for more than a quarter century, pumps forth a melody from his youth, "Mister Sandman," that soothes and pleases the weary teenagers clustered around.

Statistics show North Dakota is having a difficult time keeping its young people in the state. But tonight, in Fargo at least, no one's in a hurry to leave the party. □



Downtown Fargo blinks awake beneath a frigid dawn. When darkness returns Tom Opdahl (below) takes center stage on a freezing fire escape outside a yoga and healing arts center. Having baked in a sauna, he cools his steaming flesh in the subzero air. "It's invigorating," he says. Now that's a taste of midwestern understatement any screenwriter would love.



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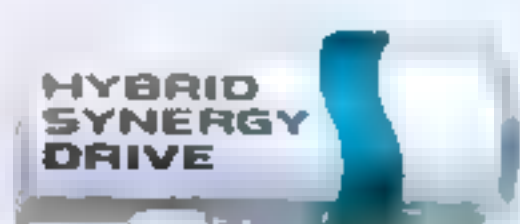
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TODAY TOMORROW

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Final Edit



BURMA ROAD

In Gods They Trust

She's unmistakably a Hindu goddess—multi-armed Kali, creator and destroyer, flaunting a necklace of severed heads—and she caught the eye of photographer Maria Stenzel. “Everything about the scene, from Kali to the Ambassador cars, just said India.”

This shop, in Ledo, has been making statues of Hindu deities for festivals since 1942, when the Burma Road was being built. “I was trying to link what I was shooting with what soldiers in World War II might have seen,” says Stenzel. But soldiers could also have seen men loading a coal train by hand (pages 90-91), an image chosen for its stronger emotional impact. “When you look at that train photo,” says picture editor Elizabeth Krist, “you feel how overwhelming it must be to shift that mountain of coal.”

WEBSITE EXCLUSIVE

Cut it or keep it? Find out more about what tipped the balance for this photo and send it as an electronic greeting card at nationalgeo.com/ngm/0311.



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If You Bought Firestone Tires or Owned or Leased a Vehicle Equipped with Firestone Tires Between 1991 and 2002,

A Proposed Class Action Settlement May Affect Your Rights.

A proposed nationwide settlement of a class action lawsuit involving purchasers of certain brands of tires made by Firestone has been reached in *Shields v. Bridgestone/Firestone, Inc. and Bridgestone Corp.*, Cause No. B-170,462, a case pending in the Jefferson County, Texas District Court ("the Court"). The Court has ordered that notice be sent to the proposed class members. Personal injury or property damage claims are not involved.

What is this case about?

Plaintiff originally filed this lawsuit seeking to represent a nationwide class of persons who owned Firestone ATX, ATX II, Wilderness AT, and other tires made by Firestone that were investigated by the National Highway Traffic Safety Administration between May 2000 and October 2001. This case, along with other similar lawsuits in state and federal courts around the country, arises out of NHTSA's investigation of those tires and Firestone's recall and replacement of certain ATX, ATX II, and Wilderness AT tires in August 2000 and in October 2001.

Plaintiff claims that Firestone sold the tires without telling people that the tires have defects in them that make the tires susceptible to tread separation. Plaintiff further claims that, had she and others who bought the tires known of the alleged defects, they would have paid less. Firestone denies all allegations and has asserted numerous defenses. The Settlement is not an admission of wrongdoing and does not indicate a violation of any law.

Who is affected?

The Firestone tires subject to this Settlement include certain sizes of the following tire brands: **ATX, ATX II, ATX Radial 23 Degree, Wilderness, American Prospector, Champion All Terrain, Dayton Timberline, Daytona, Firehawk, Force 4 All Terrain, Gillette, Lemans, Peerless, Platinum, Polaris Pathmaker, Radial ATX, Seiberling, Steeltex Radial 23 Degree, Trans Trac, Triumph Terrain, Wheel Trac, and Widetrack Radial Baja.**

To see if your particular tires are affected, you should check the Settlement Website, <http://www.firestonesettlement.com>, or call the number below to receive a detailed Notice that describes the Settlement and lists the brands and sizes of tires included in the Tire Settlement Class.

What does the Settlement provide?

Under the Settlement, for a period of at least seven years, Firestone will make certain types and sizes of its tires with

designs that include cap strips, nylon strips, or other comparable technology intended to provide high-speed capability for the tires.

Firestone also will conduct a three-year long consumer education program — using national media, a web site, point-of-sale materials, direct mail, and other efforts — with an annual budget of \$5,150,000. The consumer education program will be focused on improving consumer awareness about tire and vehicle safety issues.

The Settlement releases all claims for all members of the Class against Defendants except personal injury or property damage claims. Although Firestone's recall and replacement programs were completed prior to the Settlement, if a member of the Class has not replaced recalled or replacement tires that are still in use on his or her vehicle, Firestone will replace those tires without charge if the vehicle is brought to a Firestone Tire Service Center.

For more detailed information about the Settlement, visit the Settlement Website or call the toll-free number below to receive a copy of the Notice.

What are your rights and options?

- You may choose to participate in the Settlement and be bound by the terms of the Stipulation of Settlement, the Final Judgment, and the Releases described in the Notice.
- If you stay in the class, you may object to the terms of the Settlement by December 22, 2003. The Notice describes how to submit objections.
- If you do not wish to participate in, or be legally bound by, the Settlement, you must exclude yourself, as described in the Notice, by December 22, 2003 or you will be barred from pursuing any legal action against the Defendants related to your purchase and ownership of the tires or any vehicles on which they were installed.

The Court will hold a Fairness Hearing on January 7, 2004 to consider whether to finally approve the Settlement. At that hearing the Court will also consider the request by the lawyers representing Plaintiff and the Class for an award of no more than \$19 million for attorneys' fees, costs and expenses. You may — but need not — appear personally at the Fairness Hearing.

**To receive a copy of the Notice or for more information,
call toll-free 1-866-345-0360
or visit the Website, <http://www.firestonesettlement.com>**

Please do not contact the Court.

Reader Information

- 1. AARP**
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- 2. ALLSTATE® INSURANCE COMPANY**
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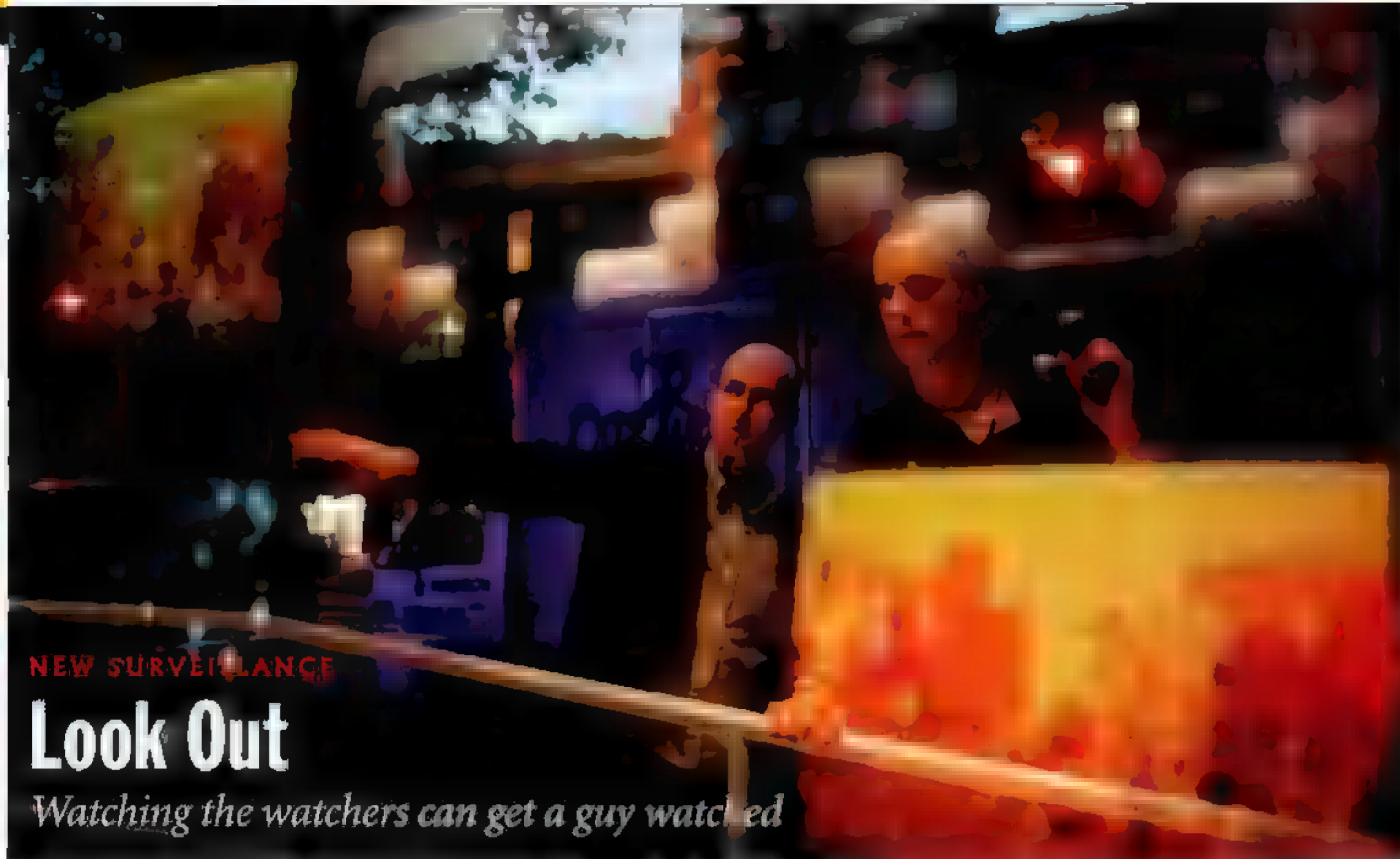
BURMA ROAD

The Rest of the Story

On the road again, and off his feet

“Not all my research was as action-packed as this picture indicates,” claims writer **Donovan Webster**, here caught napping in Myanmar (Burma), when he thought photographer **Maria Stenzel** was busy elsewhere. He had reason to rest: He’d just spent ten days helping direct 21 expedition members and two pack elephants along a narrow 70-mile, jungle-shrouded, leech-infested stretch of the Burma Road. Don, whose new book, *The Burma Road*,

is out this month, is the first Westerner since 1945 to travel virtually all 1,100 miles of the route. He had some memorable encounters, including one with a 15-foot cobra. “It was moving as if on marionette strings,” he says. “It rose four feet off the ground, looked at me, then disappeared.” To lighten things along the way, Don kept up a running joke with his guide. “I told him Maria was really a Formula One race car driver. Now she’s famous across northern Burma.”



NEW SURVEILLANCE

Look Out

Watching the watchers can get a guy watched

BOB SACHA

Big Brother wasn't watching them—but the woman in the next booth might have been, when writer **David Shenk**, at left, and photographer **George Steinmetz** visited the Remote Lounge, a New York bar where

patrons check each other out via remote cameras. The checking got more serious when George was shooting outside a U.S. spy base in England. He got several calls on his cell phone from an American-accented man

identified only as Bill. "Bill wanted to know all about me: date of birth, place of birth." But George was used to cryptic behavior by then. Many of his sources "wouldn't even tell me what they wouldn't tell me."

WORLDWIDE

The *ceibón* tree, endemic to Cuba, grows right out of the side of the island's massive *mogotes*, or limestone cliffs. Photographer **Steve Winter**, who spent months in Cuba documenting its unique plant and animal life, wanted to shoot one of these smooth-barked beauties. "I knew I'd have to be roped up and rappel down the cliff to get an image that really showed the tree," he says. Once up and maneuvering through the rain-slick foliage, Steve felt himself slip as he leaned out on the rope. Worried for the safety of his cameras, he steadied himself on the first things he could reach. "And what did I grab hold of?" Steve says. "Two cactuses. It was terrible. I had to manipulate the camera with these little cactus spines in my hands."

Wherever she is right now, **Nina Berman** (right) probably needs a sweater. "I'm kind of thin and get cold very easily," she says. Even air-conditioning gives the Manhattan-based photographer the chills, so winter in North Dakota posed real problems when she shot this issue's Fargo article. "It was 18° below zero my first day there," she remembers. "My camera iced up. The shutter just froze on me." She had to put on "many, many layers" to keep warm, but she parked her parka after photographing a downtown Fargo sauna—where half-naked patrons would step out onto the building's metal fire escape to cool off. "They'd stand on these wooden planks so the skin wouldn't peel off their feet and stay there till their bathing suits froze, which took about

two minutes. Then they'd go back in for another sauna. It was insane," she says. "So I tried it." And finally warmed to the cold? "It felt spectacular!"



DAVID BEERS

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Watch cliff-hanger Steve Winter as he shoots the *ceibón* tree, and find more stories from our authors and photographers at nationalgeographic.com/ngm/0311.

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Flashback



RALPH GRAY

YELLOWSTONE

Bear With Them

Millions saw the Gray family's photos during the 1950s—in the NATIONAL GEOGRAPHIC. Most of the year, dad Ralph wrote as the “Old Explorer” for the Society's now discontinued *School Bulletin*. But in summer he turned author and photographer for a series of family trip stories published in the GEOGRAPHIC. “We saw bears—brown, cinnamon, and black—in Yellowstone National Park,” he noted in the June 1953 issue. In fact, his kids Judith (in car) and Mary Ellen and Will (on roof) saw them closer than is advised; it's illegal today to get within a hundred yards of park bears. What the Gray treks lacked in air-conditioning, they made up for in fun. “We'd fly down the road,” Will recalls, “with the windows open and a pile of comic books in the backseat.”

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